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No. 3

THE MOST BEAUTIFUL CITY IN THE MIDDLE WEST

Some Things Which Are Needed—Police and Fire Departments Liberally Supported—Fine Park and Boulevard System
—Street Cleaning System Better Than New York's—Excellent Streets

By the Editor

THE average visitor to the city of Detroit generally leaves with the impression that it is the most beautiful city in the Middle West. Its streets are broad, well paved, kept in good repair, flanked with numerous shade trees and kept cleaner than any other city in the United States, not excepting New York. Possessing these good points it will be readily understood why the casual observer obtains so flattering an opinion of this Michigan city. When this municipality and its affairs are inspected more closely, however, it does not require the aid of a microscope to discover some of its defects. These do not change the fact that, taken for all in all, it is the most beautiful city in this section of the country.

Some Things that Need Correction

Most of the ills which now afflict Detroit are due to an imperfect State municipal code, its defective charter and partisan politics. It has had recent experience with so-called "ripper" legislation, but nothing in comparison with that of some other States; for instance, Pennsylvania and Ohio. The State Legislature of last year "ripped" out three old commissions — board of public works, park and police—of three members each, replacing them with one-man commissions. While this action was wrong in principle, it appeared to be the only way to rid the city of some alleged evils existing in the Board of Public

Works. In this particular instance the end would seem to justify the means.

That the municipal code of the State of Michigan needs revision there can be little doubt, for the reason that it unjustly and unwisely encroaches upon the privileges of home rule. If it were merely a matter of sentiment it would be all right to permit the present code to continue, but when any corporation, such as a telegraph, telephone or electric light company, can go to the State authorities and obtain permission to string its wires overhead or lay them underground, in a city like Detroit, without the permission from the city authorities, a great injustice is done. While the civic administration has tacitly given permission for various companies to do business within its limits when they have come from the State authorities, yet it is impossible to prevent the entrance of any such

company if the State should so will. Out of this has grown an evil which is a menace to the streets of the city and is sure to increase the burden upon the taxpayers annually. The civic authorities and reformers are in part to blame for this condition. As a result, every telegraph, telephone and electric light company, including the municipal plant, constructs and operates its own system for laying wires underground. This means that each company must occupy its own particular position in the streets and that when its conduit is constructed or re-



THE CITY HALL

paired the streets must be torn up for a longer or shorter period. No matter how carefully any pavement is replaced, it is a well-known fact that this shortens the life of a pavement more than extraordinary traffic. To any well-conducted city this way of doing things will be considered exceedingly bad practice.

But the city has many excellent features. Its various departments, as a rule, are liberally supported and their affairs faithfully adminis-

The Board of Public Works

The "ripper" legislation, which supplanted the three-man board with a one-man commission, without doubt was a step in advance. As evidence of this fact, the aggregate estimate for appropriations for the three commissions amounted to one-half a million dollars less this year than last, when the departments were under the control of the three-man board. Another point gained was the selection of

POPULATION, AREA AND ASSETS OF THIRTEEN CITIES

	Popu- lation.	Area, acres.	Cash in treasury.	Cash and bonds in sinking fund.	City hall.*	Police department.*	Fire department.*	Schools.*	Libraries.*	Parks.*	Total assets.
Cleveland, O.	381,768	21,190.00	\$4,924,289	\$2,607,596	\$48,000	\$465,810	\$779,000	\$4,950,507	\$185,506	\$7,478,000	\$38,894,226
Buffalo, N. Y.	352,387	32,599.54	769,247	1,205,412	† 1,607,400	427,484	965,782	3,667,304		3,661,155	24,902,948
San Francisco, Cal.	342,782	77,520.00	656,305	208,169	7,540,000		1,656,000	5,415,200	†	12,000,000	29,905,356
Cincinnati, O.	325,902	22,560.00	1,387,915	5,579,894	1,863,441	193,000	1,278,775	4,251,668	835,000	1,500,000	67,138,307
Pittsburg, Pa.	321,616	19,418.17	6,779	5,446,071	945,000	217,317	1,037,924	3,921,051	1,273,773	3,603,870	30,349,244
New Orleans, La.	287,104	126,080.00	175,937		180,000	14,500	362,900	1,259,500	115,000	2,208,000	15,729,932
Detroit, Mich.	285,704	18,700.00	1,092,492	1,965,280	2,140,430	288,030	1,634,971	3,195,005	548,000	6,588,970	27,212,621
Milwaukee, Wis.	285,315	14,400.00	450,847		1,200,000	237,227	1,021,272	3,242,657	1,079,000	2,625,339	19,412,368
Washington, D. C.	278,718	44,320.00	† 2,223,549	537,426		148,795	425,021	4,576,174	20,000	300,000	12,205,793
Newark, N. J.	246,070	11,840.00	176,415	4,295,359	145,000	150,000	750,000	2,426,375	505,000	5,073,234	25,561,000
Jersey City, N. J.	206,433	7,731.20	622,397	3,028,934	900,000	148,000	362,535	1,732,650	340,463	528,500	17,479,731
Louisville, Ky.	204,731	12,800.00	309,370	2,119,298	530,000	52,300	498,000	1,393,600		1,050,000	16,061,245
Minneapolis, Minn.	202,718	34,105.60	409,817	1,872,115	1,306,122	93,052	436,722	2,940,062	351,626	4,587,258	19,324,765

† Cash on hand at end of fiscal year must be returned to United States Treasury and made available again only by act of Congress. * Including land, building, apparatus, etc. † City owns land and one-half of building. ‡ Included in city hall.

tered. Its municipal water and light plants, of which a more extended description will follow, are among the best in the country. Partisan politics, as in most cities, injures the administration of these departments to a certain extent, but as in most other cases, the tendency leans toward reform in this matter.

The Hon. William C. Maybury is now serving his seventh year as chief executive. He has been elected by the people for three successive terms, of two years each. The "ripper" legislation, which

Mr. D. W. H. Moreland to act as the commissioner. Mr. Moreland is a man of striking personality, with a rare executive ability and a forceful and rapid way of dispatching the city's business. His responsibilities are great, but if any mistakes are made it is easier to locate the cause with one man in charge than with three. With a competent corps of assistants including the services of Secretary Ogg, the affairs of this department can be more effectively administered than when the responsibility is divided among three.



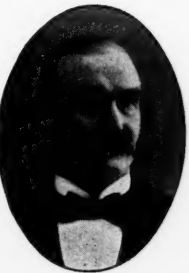
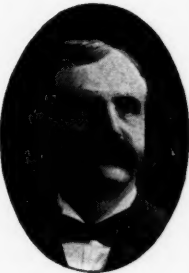
THE ASPHALT PAVEMENT ON CASS STREET

created the one-man commissions, at the same time extended his term of office one year. While his administration has not been characterized by the forcible and erratic peculiarities of his predecessor, the late Governor Pingree, nevertheless, it is his strong personality which has won him this place as a Democrat. He has not only had the support of his party, but of many independent Republicans. The next election will occur in the fall. It is too early for the announcement of candidates, but it is more than probable that if Mayor Maybury chose to run again he could be elected.

This is not Mr. Moreland's first connection with this department as he was one of three during a previous period. Several unique methods have originated with him. For instance, on his recommendation, enameled signs with a white lettering on a blue enameled background, with the following words, "Please do not spit on the sidewalk," were posted up at street corners all about the city, particularly in the business section. Although no penalty was attached and it was a simple request, Detroiters have formed the habit of going to the curb whenever expectoration has been necessary. As a con-



Police Com. Fowle (beginning at right at top), Park Com. Bolger, Com. Moreland of D. P. W., City Clerk Schmid, Chief of Police Downy, Fire Chief Kennedy, Secy. Ogg of D. P. W., Secy. Hatch of Light Com., City Engineer Ferguson, Health Officer Kiefer.



sequence the sidewalks of the business portions of Detroit present a much more cleanly appearance than is found in other cities. For years the city has made it a practice to keep all sidewalks in repair at its own expense, excepting when a sidewalk is to be relaid entirely. Mr. Moreland provided a quick repairing outfit, which consists of a horse and wagon, equipped with the necessary tools and materials for doing repair work. As soon as an inspector, or any other person, reports to the department of public works that a plank is missing or a sidewalk is defective this wagon is sent out post-haste and the repairs made immediately. In this way the city is saved, annually, thousands of dollars in damage suits. It is a good practice for other cities to follow.

Shortly after the "white wings" were organized by Colonel Waring to clean the streets of New York, Mr. Moreland, who was then in charge of the street cleaning of Detroit, introduced the system in that city. The organization is more complete and efficient than that of New York at the present time. Hundreds of miles of streets and alleys are kept clean the year round. Dirt, refuse and filth are taken care of and this part of the municipal house cleaning has been performed in the most thorough manner. Most of the "white wings" are Italians. Excellent discipline is maintained. The men are obliged to keep their white uniforms and helmets in perfect condition and have their shoes blacked every day. They are not permitted to smoke while on duty. They are not allowed to enter saloons during working hours. They are not permitted to speak to any person

STREET CLEANING STATISTICS

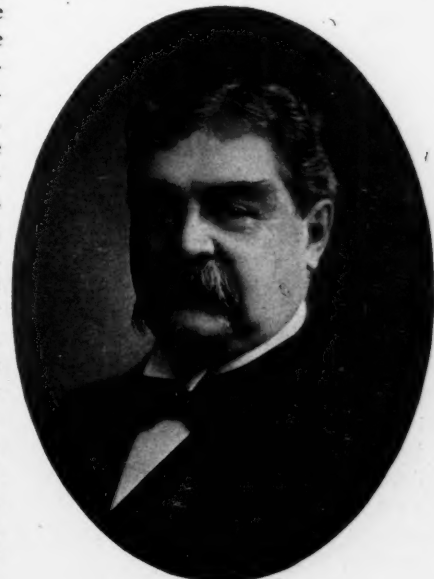
	Swept by hand or machine.	Swept by city, sq. yds., per week.	Persons employed by city.	Cost of maintenance.
Cleveland, O.	Both			\$55,657
Buffalo, N. Y.	Both	3,590,400	57	178,310
San Francisco, Cal.	Both			167,906
Cincinnati, O.	Both	6,000,000	197	199,641
Pittsburg, Pa.	Both	9,000,000	400	157,823
New Orleans, La.	Hand	2,400,000	175	120,303
Detroit, Mich.	Both	5,110,026	257	157,196
Milwaukee, Wis.	Both	9,400,000	400	179,599
Washington, D. C.	Both	1,750,000	79	174,679
Newark, N. J.	Both	2,132,054	300	123,747
Jersey City, N. J.	Both			† 62,773
Louisville, Ky.	Both	2,100,000	128	† 102,899
Minneapolis, Minn.	Both	10,000,000	420	170,091

* For six months no sweeping. † Including garbage removal.

while on duty nor to answer questions. The third offense in disobeying the rules and regulations means dismissal from the department. It cost \$161,440.58 to maintain the department last year. This was under the three-man commission. Although the department has been returned to Mr. Moreland's care in a somewhat demoralized condition, he expects to maintain it at a less cost during the coming year than during the past.

The "white wings" are equipped with brushes and push carts, the latter being supplied by the Chapman Manufacturing Company, 508 East Nineteenth street, New York; the machine street sweepers by The F. C. Austin Manufacturing Company, of Harvey, Ill., and William C. Oastler, 43 Exchange place, New York. A fifteen-ton roller, which is used by the department, was also supplied by Mr. Oastler, and a seven-ton roller by the Pioneer Iron Works, of Brooklyn, N. Y. The sprinklers used by the department were purchased from Studebaker Bros., South Bend, Ind., and F. C. Austin Manufacturing Company, of Harvey, Ill.

The cleanliness of the city has largely been brought about by educating the people. As in every other city, the average citizen formerly threw his waste paper, peanut shucks, fruit peels, etc., into the street; now he consigns them to the receptacles provided for that purpose. Simultaneously with the organization of the "white wings" the use of the "litter barrel" was introduced, and one placed on every corner of the down town section and at convenient intervals throughout the city. The newspapers came to the assistance of the department and urged both old and young to use these receptacles whenever necessary. Tons of refuse are collected every year from these barrels and the people have formed the habit of consigning all refuse matter to these receptacles. It costs much less, per ten thousand square yards, to clean the streets of Detroit than New York or any other city which approaches real cleanliness. Commissioner Moreland not only employs the "white wing" system, but uses modern



WILLIAM C. MAYBURY,
Mayor

STREET PAVEMENTS

	Miles of streets paved with					Total miles streets	
	Granite and Belgian block.	Brick.	Asphalt and asphalt block.	Macadam.	Paved.	Unpaved.	
Cleveland, O.		79.30	11.20	.73	184.13	300.00	
Buffalo, N. Y.	6.24	9.05	223.63	3.29	335.89	300.00	
San Francisco, Cal.	90.88		80.82	175.00	366.91	383.00	
Cincinnati, O.	47.00	40.00	23.00	193.00	386.00	244.00	
Pittsburg, Pa.	88.47		90.10	21.90	257.04	230.00	
New Orleans, La.	25.65	5.95	25.24		205.80	494.20	
Detroit, Mich.	* 2.05	26.31	26.31	12.64	285.89	282.00	
Milwaukee, Wis.	8.77	2.65	13.90	.45	310.93	210.12	
Washington, D. C.	27.69	.52	125.77	34.40	231.65	47.67	
Newark, N. J.	46.25	3.85	41.54	10.05	114.44	103.50	
Jersey City, N. J.	75.78	.05	13.94	16.33	124.62	76.66	
Louisville, Ky.	17.32	31.56	17.84	78.83	116.14	60.00	
Minneapolis, Minn.	12.69	9.13	12.88	5.34	100.26	689.67	

* Granite only.

to hand, is full of valuable articles of interest to all citizens. John De Witt Warner writes on *Municipal Betterment in the New York City Election. A Constructive Policy*, by John Martin, tells what the Low administration in New York should do. Bird S. Coler writes in *Amend the Debt Limit* on the limitation of the debt limit for New York. William S. Crandall, in *A Model City*, gives a suggestion for the Louisiana Purchase Exposition in 1903. Under the general caption of Decoration of Cities are articles by F. W. Kelsey on *Parks and Tree Planting*; *Plant Decoration*, by Katherine C. Budd; *Municipal Sculpture*, by C. A. Lopez; *Decoration of Public Buildings*, by C. M. Shean; *Beautifying Columbus Circle, New York*, by A. P. Doyle; *Street Signs and Fixtures*, by Nelson S. Spencer; *Advertising and Art*, by Milo Roy Maltbie. New York, N. Y. Price \$2 per year; 50 cents a copy.

The Century for February contains two very interesting articles relative to the improvement of the city of Washington, D. C. Daniel H. Burnham, of the Commission for the Improvement of Washington, contributes a short article on the *White City and Capital City* in which he shows how the World's Fair at Chicago proved to the American people that, while their money had been spent in artistic ways, "their vital discovery was the fact that they had built great public works in piecemeal, unrelated, and without the unity of a comprehensive general plan." "It would seem, therefore, that the World's Fair was first of all a result of dumb desire already strong in American hearts, and, second, that it became not only the embodiment of what people vaguely felt, but that it also taught that public money put into public buildings and grounds is used rightly, and so economically, only when every part of the system of public works is related to every other part, and each and all parts are constructed after a general plan." Charles Moore, Clerk of the Senate Committee on the District of Columbia, presents his first paper on *The Improvement of Washington City*. This set of papers will tell the whole story of the proposed improvements in the Capital City. He reviews briefly the way in which the French engineer, L'Enfant, worked out the grand scheme for the laying out of the city in conjunction with Washington and Jefferson. The third plan drawn by L'Enfant was accepted. "In this accepted plan undoubtedly Washington and Jefferson each had some part." "In a word, he (L'Enfant) planned the Capital City as a work of art, in which each feature should have distinct relation to every other feature; and thus he gave to the scheme that feeling of unity which to-day excites the interest and admiration of the visitor in Paris." L'Enfant conceived an exaggerated idea of his own importance, was dismissed, and so his plan has never been carried out. The Shepard régime did much to place Washington in as good a condition as it is in to-day. A Senate committee was appointed in March, 1901, to develop the park systems of the District, and, if the money is voted by Congress, their plans will make of Washington one of the most beautiful cities in the world. The general plans of the Commission in charge of the work are given in this and articles to follow. New York, N. Y. Price per year, \$4; per copy, 35 cents.

BOOKS

The Improvement of Towns and Cities. By Charles Mulford Robinson. One Vol. Price \$1.25. G. P. Putnam's Sons, New York and London.

The author of this volume is a member of many societies for the improvement of municipal conditions and speaks *ex cathedra*. Among the subjects which he discusses are sites, street plans, bridge construction, street paving, cleaning and lighting; the disposal of necessary nuisances, such as wires, smoke and the noises of street traffic; the regulation of advertising, the beautifying of utilities, the growth of trees and possibilities of public gardens. All these topics are suggestive to any one acquainted with municipal affairs, and Mr. Robinson's ideas are good. Public parks and museums of art come in for their share of comment.

THE retirement of Mr. Richard Croker from the position of chairman of the Finance Committee in Tammany Hall has caused much speculation as to the meaning of this move of the "Boss." Mr. Croker is not a man who would let a defeat such as was ad-

ministered to him last fall deter him from keeping in his hands the mastery of his party. A perusal of his life in Alfred Henry Lewis' *Richard Croker*, in which the life of the "Boss" is told most vividly, would establish this fact in the minds of those that might consider him weak-kneed. The author follows the man from the beginning of his life in New York, where he came at the age of three, through all the vicissitudes that attended him as a politician, portraying in the list of virtues. To the author the bull-dog character of associates both personal and political. Mr. Lewis has had a long acquaintance with Mr. Croker and other leaders in Tammany Hall, and is in position to write from personal knowledge. At times the author breaks out in sarcasm against what he styles the "character of mugwump moralist," who sets physical courage and strength low in the list of virtues. To the author the bull-dog character of Richard Croker is the highest and most worthy of attainment. To him the perfect savage is the perfect man. The thrilling story of the murder of Florence Scannell is the portion of the book best written. The publishers are the Life Publishing Company, New York, N. Y. Price, cloth, 372 pages, illustrated, \$2.00.

The Science of Penology, by Henry M. Boies, treats of the defence of society against crime. In spite of the great expenditure of effort and money, crime continues unabated, and it is the duty of the authorities to solve the problem. To do this a complete plan must be formulated, and it is the object of this work to present such a plan in the hope that it may aid the authorities in their work. The author first defines penology and then takes up the consideration of crime, the criminal class, and their detection, criminal codes, penalties and the reformation of criminals of all kinds, and the minor criminals and the best methods of dealing with them. Mr. Boies is a member of the board of public charities and of the committee on lunacy in Pennsylvania, and has had long experience in the administration of penal laws, and he is therefore competent to write intelligently and with authority. Published by G. P. Putnam's Sons, New York, N. Y. Cloth, 459 pages.

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THREE DOLLARS PER ANNUM

Paper on Bituminous Macadam Pavements

By Fred. J. Warren

Read before Boston Society of Civil Engineers

January 8th, 1902

**Compliments of
Warren Brothers Company**



Office of
Superintendent of Streets,
Cambridge, Massachusetts

December 31, 1901.

Warren Brothers Company,
No. 143 Federal Street,
Boston, Mass.

Gentlemen:-

Yours of the 25th ultimo is at hand. The bituminous macadam pavement laid by your company on Temple street presents a very handsome appearance as finished, and possesses a number of advantages over the ordinary pavement, viz:- It is free from dust or mud; it is comparatively noiseless, and is not nearly so slippery as asphalt or a similar pavement.

The several stages of the construction of the street were closely watched, and, from the character of the material and work put into it, I have every reason to believe that it will prove to be a durable and economical pavement.

Very truly yours,

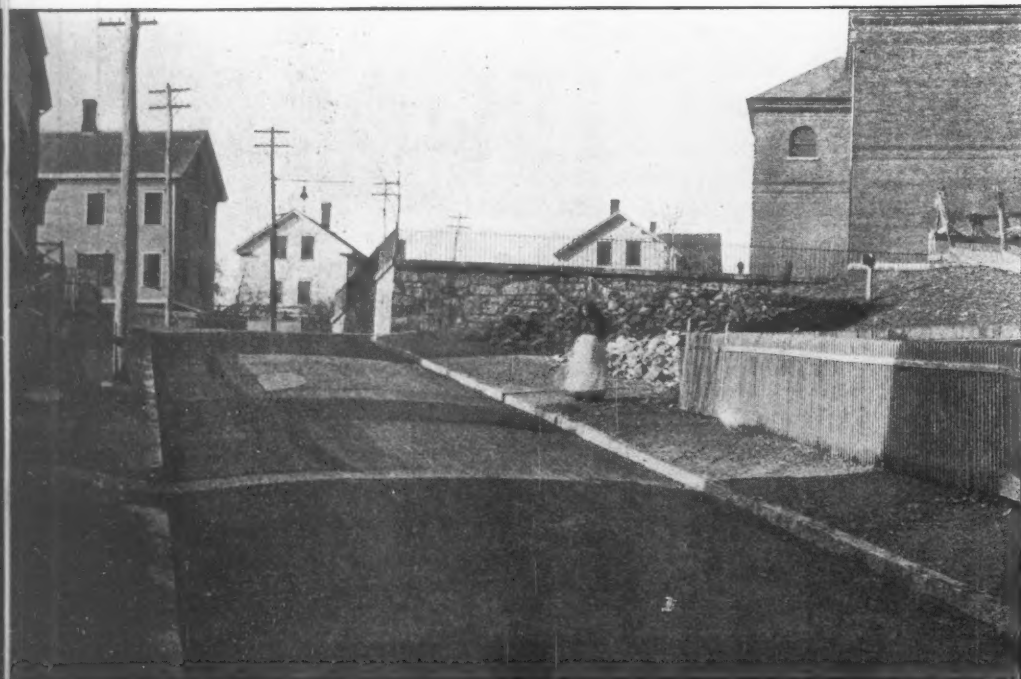
C. H. Brown
Supt. of Streets.

President Massachusetts

Highway Association.



TEMPLE STREET, CAMBRIDGE, MASS.



HARVEY STREET, PAWTUCKET, R. I.

THIS BLOCK 12 PER CENT. GRADE, UPPER TWO BLOCKS HAVE 8 PER CENT. AND 5 PER CENT.



WILLIAM H. BARCLAY, COMMISSIONER
ISAAC GILL, ASSISTANT COMMISSIONER

DEPARTMENT OF PUBLIC WORKS.

OFFICE OF COMMISSIONER.

MASONIC TEMPLE BUILDING.

Pawtucket, R. I. December 19, 1901

Messrs. Warren Brothers Company,
143 Federal Street, Boston, Mass.

Gentlemen:-

I take pleasure in reporting as very satisfactory the present condition of Harvey street improved early last June under the direction of your Company with a coating of crushed stone mixed with bitumen prepared especially for that purpose in accordance with your patented system of building Bituminous Macadam Pavements. The roadway has successfully withstood the extreme heat of the past summer and is giving equal satisfaction under the extreme cold of our northern winter.

Notwithstanding the fact that a portion of the street has a 12% grade, our heavy rains have had no appreciable effect for the reason that the surface is free from voids. On our steep grades ordinary macadam washes out badly during every heavy rain.

The surface of the roadway is impervious to water, and affords an excellent foothold even on this extreme grade. I have no hesitation in saying that it gives every promise of being a durable and very satisfactory pavement at moderate cost. I have watched the pavement very closely since it was laid, and we are all very much pleased with it.

Park Place laid by you about the same time on a flatter grade is giving equal satisfaction.

Respectfully yours,
William H. Barclay
Comm'r of Public Works.

BOARD OF PUBLIC WORKS.

o o o

MICHAEL F. WALSH, CHAIRMAN.
GILBERT POTVIN, JR.
O. D. ALLYN.

o o o

JAMES L. TIGHE, CLERK.
OSCAR C. FERRY, ASST. CLERK.

o o o

CITY OF HOLYOKE, MASSACHUSETTS.

December 21, 1901.

Warren Brothers Company,
143 Federal Street,
Boston, Mass.

Sirs:-

The satisfactory condition of the pavement during the summer months convinced us that the only possible question was as to how it would stand the winter. The pavement has now passed two extremely cold spells followed by thaws and its condition is very satisfactory showing that it is a pavement for winter as well as summer.

Respectfully,

M. F. Walsh.

MAPLE STREET, HOLYOKE, MASS.,
BEFORE BEING IMPROVED AND
AFTER BEING IMPROVED WITH
WARREN'S BITUMINOUS MACADAM.





OFFICE OF
SUPERINTENDENT OF STREETS,

ROOM 67, CITY HALL

Lowell, Mass., December 31st, 1901.

Messrs. Warren Brothers Company,

143 Federal St., Boston, Mass.

Gentlemen:-

I take pleasure in commending in the highest terms your Bituminous Macadam Pavement as laid by our City under your patent and supervision and with bituminous material furnished by you, on Adams and Decatur Streets in Lowell during the past season.

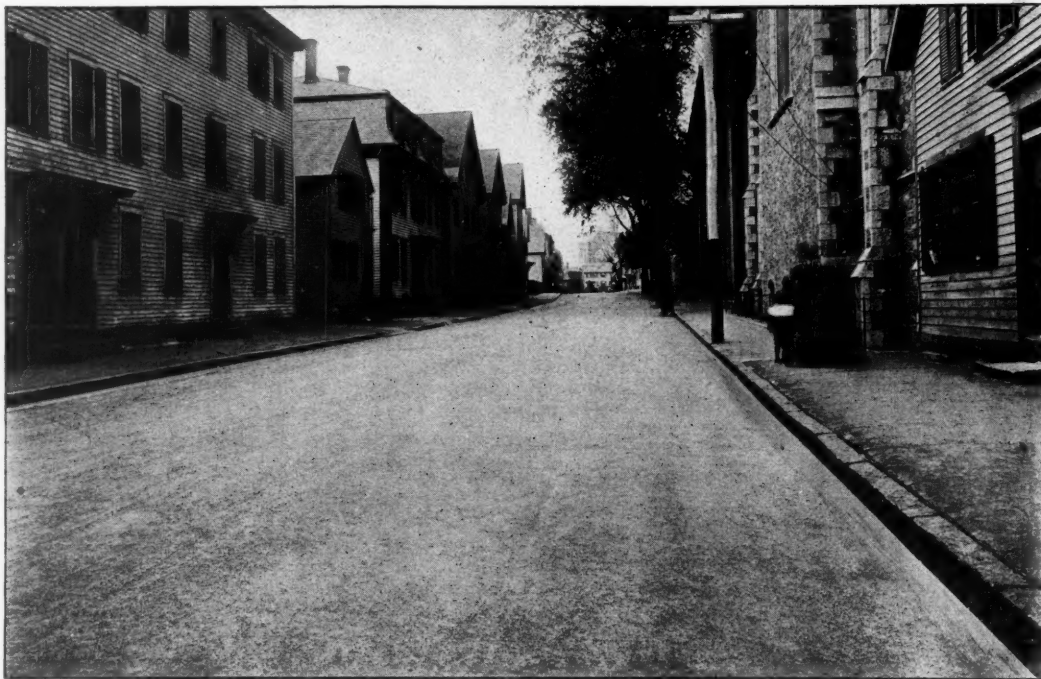
Since the pavement was laid, and while it was being constructed, officials from a number of cities have been here and inspected it and all have been very favorably impressed with its utility and economy. Our citizens are much pleased with it, and I believe that this construction solves the paving problem for Lowell. The pavement is smooth and yet not slippery, affording the foothold of macadam and the solidity of asphalt. In fact it combines the advantages of macadam and asphalt and overcomes the objections of each.

The pavement was not only highly satisfactory during the summer months, but now that it has reached mid-winter is giving equal satisfaction.

Very truly yours,

R. F. Brady

Superintendent of Streets



ADAMS STREET, LOWELL, MASS.



WALNUT STREET, SALEM, NEW JERSEY.

MAYOR'S OFFICE.
SALEM, N. J.

Warren Brothers Co.,
Gentlemen,

Salem, N. J.

12, 7,

190

Many years ago I became interested in street improvement being led thereto by the miserable condition of the roadways of this city, which were then constructed of gravel and oyster shells. Our streets being shaded by trees planted along the sidewalks are naturally kept from that exposure to sunlight and wind that are essential to good roads constructed of such materials. Not being an engineer or a practical road builder, and being forced to seek some method of road building that would have the first essential of comparative cheapness, I decided that macadam roads were the best suited to our means and our necessities, and we built nearly three miles of such roadways. After they were finished they suited us, excepting that we found that they would require constant sprinkling to prevent raveling, and to prevent the ground-up portion and the dust put on the surface blowing away with every breeze of any force, thus exposing the larger stones beneath and making the roadway rough. It was at this point that I stumbled on a newspaper account of the tarred macadam roads of Hamilton, Ontario and soon after on your article pointing out the merits and the deficiencies of these pavements. I visited Cambridge and there saw the road that you had built, and was convinced that it was the ideal road construction. As a result, we have had one street 1250 feet long and 21 feet between the gutters, surfaced with the bituminous macadam, putting six inches of rock underneath, and we have a roadway as smooth and as noiseless as asphalt, while a dressing of stone screenings on the surface gives a grip for the horses similar to the surface of an ordinary macadam road. There is no dust, no raveling. The street can be swept with the sweeper, and it is far and away the finest road in our town, and so conceded by all. In addition, we had the intersection of two of the busiest streets in town also surfaced, and it is subjected to the hardest travel of any bit of road in Salem. Although it has been in constant use, and has had hard use, for over a month there is not a scar on it. I am thoroughly convinced of the durability of this pavement, and as well satisfied are our people with this material that had we known of it sooner every inch of road in our town would have been constructed of it, and it has been decided that, as our macadam wears out, it will be replaced by the bituminous macadam. I unhesitatingly recommend the Bituminous Macadam pavement for its beauty, its durability and its cheapness.

Yours, &c.,

Robert Gwynne
Mayor.

BITUMINOUS MACADAM PAVEMENTS

The Principles Involved—The New Pavement Laid in Seven Cities the Past Season—Large Contracts Secured for 1902—Has Characteristics of an Ideal Pavement.

By Fred J. Warren

THE name conveys an impression of what the pavement is, yet is a misnomer. It might properly be called a bituminous concrete, yet it is combined on different theories from what is known as asphalt concrete or tar concrete or tar macadam. It is more properly a concrete wearing surface than other bituminous mixtures in general use and is built more on the principles of hydraulic concrete.

The pavement in view, in the introduction of the name, "Bituminous Macadam," is one built on entirely new theories, or more properly, a new combination of those established facts and conditions which have been developed from the various uses to which bitumen has been subjected in over twenty centuries of use, and combining with this experience the durable qualities of stone.

It is well known that all bituminous pavement wearing surfaces are in fact artificial stone surfaces—the bitumen or asphalt being used to bind particles of stone or sand together. By far the greater bulk of the surface of the ordinary asphalt pavement is sand, and the names "asphalt pavement," "tar pavement" or "bituminous pavement" are misnomers, and simply convey in a very general way the nature of the cementing vehicle.

Each one of these cements may be subdivided into a thousand or more subdivisions, and the quality and physical properties can be measured and determined by chemical and physical tests. While much headway has been made in recent years toward perfection of methods of testing and examining the bituminous cements and mixtures, there is hardly a subject of such importance to engineers about which so little is known and recorded.

THE PRINCIPLES INVOLVED

The principle on which the bituminous macadam pavement wearing surface is combined, is the reverse of the principles on which the ordinary asphalt pavement is built. In the present asphalt or tar pavement the bituminous cement is used to support fine mineral grains, such as sand, which in themselves have no firmness to sustain traffic, in such a way that the fine mineral grains will be held or supported by the bituminous cement so that the mortar or mastic will, at all atmospheric temperatures, sustain the weight of traffic, and, at the same time, resist abrasion.

The bituminous macadam is built on the principle that, independent of the bituminous cement, relatively coarse and fine mineral grains should be combined in such a way as to have a firmness in themselves to sustain the weight of traffic. The bituminous cement is supported, or held in place, by the proper arrangement of stone particles as to size. The bituminous cement is used solely for the purpose of preventing attack on the stone from water and weather, and to bind the particles together sufficiently to prevent abrasion from traffic at all atmospheric temperatures and, at the same time, provide an elastic bituminous cement or cushion between the mineral particles which will deaden the jar and prevent the wearing effect caused by the friction from the movement of its integral parts.

The life or efficiency of either pavement depends largely upon the skill and care with which the various elements of the wearing surface are selected and combined, but I believe it is possible to select and combine the elements on the principles of my theory, or as practiced in the bituminous macadam pavement, so that the pavement will have several times more life than when constructed on the asphalt theory, and I feel much more certain that over 95 per cent. of the causes of failure can be overcome by the adoption of the bituminous macadam principle. I will undertake to give what seems to me to be absolutely proven reasons for this opinion.*

EDITOR'S NOTE.—This is the substance of an address delivered by Mr. Fred J. Warren, before the Boston Society of Civil Engineers, January 8, 1902.

It is a fairly well known fact that bitumens of certain grades have been known to remain plastic and intact for more than twenty centuries, as in the walls of Babylon and the Tower of Babel. It would be impossible except in a dense mixture. It is also a fact, but not so generally known, that so long as a bitumen remains plastic there is no perceptible wear from abrasion, and that the wear of a bitumen can only take place from its becoming hard and, passing beyond a plastic state at low atmospheric temperatures, when it becomes brittle, and will crumble. Some forms of bitumen may also lose their viscosity and their plastic nature and ductility, by the chemical action of water acting on soluble salts contained in it. In a liquid state bitumen will have little or no plastic properties.

The pavement being described under the name of bituminous macadam is a patented combination of bitumen and mineral particles. It is being laid at a less price than asphalt or brick in New England. Its actual cost of construction is not materially different from the actual cost of constructing an asphalt pavement, but the price to cities is much lower on account of the commercial policy of those controlling its introduction.

COMPETES WITH ANY OTHER PAVEMENT LAID

The pavement has been laid in Pawtucket, R. I.; Holyoke, New Bedford, Cambridge, Lowell and Brockton, Mass.; Salem, N. J., and Charleston, S. C. It enters into competition with every other form of pavement. It has already been ordered on ten miles of streets in various sections of this country and Canada, for work to be done next year, and is now being considered on miles of streets in all sections of the country from the Pacific to the Atlantic.

Before it was actually laid, the only undeveloped theory entering into the construction was, "Can coarse particles of stone when used near the surface of a bituminous pavement be held in place so they will not chip out under traffic?" The most trying time to test this question is when the surface is new and has not had the advantage of compression by traffic. In no case has any individual stone slipped out of the surface in any of the seven cities where it has been used.

The areas laid in each of the cities are small, as measured by miles, but are sufficient to demonstrate the fact that the body remains intact under traffic; all other principles incorporated in the pavement are those which have been demonstrated to give the greatest possible life to a bituminous cement, and are simply the adoption of well established principles which could not be practiced in the ordinary asphalt pavement, because of the nature of a surface made of sand and asphalt. It is believed by many engineers who have the qualifications and experience to give their judgment great weight and who have looked carefully into the principles involved, that its natural development will give a pavement with much more life than any other form of bituminous pavement yet devised.

The ordinary method employed in its construction is to assume that a natural foundation thoroughly rolled with a heavy road roller, furnishes a solid sub-base; that a solid base of four inches, of two-

* Attention should be called to the fact that so called "tar macadam" is built on the principles of the ordinary tar concrete, with the exception that stone is used instead of gravel for the foundation, and only about the same quantity of surface mixture is used as in the ordinary tar sidewalk. An effort is made to force the surface into the foundation by rolling with a heavy roller. It is an imperfect method of accomplishing a result. Its efficiency is largely determined by the extent that the surface mixture is forced into the base, and the life is also largely determined, as are all other bituminous pavements, on the proper selection of the elements making the surface. I do not see that the pavement offers any advantage or is any different in principle or wearing properties, over what is known as tar concrete, except that a heavier roller is used in the compression. The "tar macadam" process does not overcome the principal causes of initial failure.

inch to two and one-half-inch stone will, after thorough compression with a fifteen to twenty ton roller, provide an ideal foundation for a waterproof surface, and will provide drainage to moisture accumulating from the surrounding ground. If more drainage is necessary, drains rather than extra foundations are advisable. The stone is better if very hard, but this is not so important in the foundation as in the top.*

Such a foundation offers many advantages over hydraulic concrete, in that the overlying courses enter and bind into the foundation, and the foundation aids in holding the top or wearing surface in place.†

On top of the stone foundation is spread, or sprinkled, a coating of specially prepared thin bituminous cement which enters the minute crevices of the surface of the stone and permits the stone in the foundation being firmly held together with the waterproof cement which is afterwards freely used over the surface of the foundation. This waterproof cement is thus enabled to grip onto the stone permanently and, being of a hard pitchy nature of a grade of flexibility that will bind the surface of the foundation firmly in place, it makes the foundation itself rigid before the wearing surface is rolled in.

On top of the foundation thus prepared is spread a layer of the wearing mixture which should have a thickness of about two inches after its maximum compression. This mixture is a carefully prepared combination of one-inch and two-inch stone, having voids filled with receding sizes to a dust or powder of stone. Some sand may be used to aid in filling void when necessary.‡

METHODS OF PREPARATION

The mineral or stone part is dried and heated in a modern dryer and is then separated by screening with rotary screen into its sizes varying from fine dust, which is less than 1/200 of an inch in diameter, to the largest size used. The several sizes of stone are then mixed in predetermined proportions, so as to reduce the voids to about 10 per cent., in a modern "twin pug" steam power mixer, and the hot bituminous cement is added in the mixer in sufficient quantity to not only coat every particle and fill all of the remaining voids, but with enough surplus to furnish to the mixture after compression, a rubbery and slightly flexible condition.

The mixer makes seventy-five revolutions per minute, and every particle of mineral is coated in about fifteen seconds, but the mixing is continued about two minutes to provide absolute uniformity of distribution of bitumen and mineral. The whole is dumped by gravity into wagons and hauled to the street where it is spread in the same manner as an asphalt pavement. It is then rolled with a fifteen to twenty ton road roller, which gives many times as much compression to the inch run as the ordinary asphalt roller.

After a thorough and continuous rolling there is a little honey-combed appearance to the surface where coated particles of stone come together, but the body of the mixture on being broken shows denser under the magnifying glass than any bituminous wearing surface that has heretofore been used.

Good rolling is an essential feature, as it assists to place the particles where they belong, and continued rolling forces out the minute air bubbles and forces the surplus bitumen into the fine voids, leaving

* In resurfacing macadam the surface should be roughened and, on resurfacing other forms of relatively smooth pavements, an intermediate or binder layer of coarse stone and hard bitumen should be used to hold the surface firmly in place.

† I would argue that it has been fully demonstrated through the experience of the practical use of millions of square yards of macadam roads and of a few miles of asphalt pavement, that a well rolled crushed stone foundation will stand the pressure of traffic. The two oldest asphalt pavements in this country are laid on this class of foundation, notwithstanding that, at the time of their laying, proper rolling as practiced to-day was not in vogue. The only function of the concrete foundation is to sustain the weight of the load, and its utility in this requirement cannot be questioned. It fails to aid in holding the wearing surface in place, as it presents a smooth surface, causing tendency of the wearing surface to shift. It fails to offer proper drainage under the pavement and, on the contrary, is a trap for moisture which is always an important factor in sub-surface construction. In an asphalt pavement the moisture thus held often is the cause of disintegration or rotting from the base upwards. It should only be used in cases of very poor soil or other conditions affording a weak sub-formation.

‡ The large stones for use in the wearing surface, as well as the fine stone in receding sizes, should be from a sound hard rock and one which is least subject to wear by abrasion. Of course the locality, quality, condition of traffic and cost, will be controlling features in the selection.

the body of the surface so dense that it cannot be rotted or displaced by traffic. It also adds to the life of the bituminous cement by protecting it from the action of exposure to the elements in minute semi-detached particles. The rolling should commence as soon as the surface is spread, and it is advisable that one heavy roller should not be required to do more than 1,000 square yards of surface per day.*

The tanks or heaters used to heat all grades of bituminous cements should be so arranged as to easily control the heat, as overheating and the consequent change in the physical qualities of the bitumen are frequently the cause of initial poor work in all forms of bituminous pavements.

Great care should be exercised in heating the stone or mineral parts, as overheating the stone will cause rapid change in the softness or ductility of bituminous cement, each particle of stone being coated with a layer of less than 1/500 of an inch in thickness; the effect of high heats in this condition of exposure is very rapid on the cement.

This condition is not so important as in the asphalt pavement, as the coating of the cement is heavier, and it is used in a softer form and therefore has more life to lose, before it becomes inefficient. It is nevertheless important, for the cement is prepared with an allowance made for the normal change in making the pavement, and if the change is abnormal, the physical differences may affect the life of the work.†

On top of the surface thus made, partly to heal and seal the surface from attack, and partly to hold and help make a practical wearing surface, there is poured and rubbed into it all of the quick drying bituminous cement that it will take. This leaves the surface as sticky as if freshly painted.

On this surface is spread a coat of fine stone chips which adhere to the bitumen on the bottom and present a rough, gritty surface to travel. The rolling of these rough chips into the surface has the effect of putting the pavement under greater pressure, and forces as much stone into the surface as it can possibly receive, thus making it more gritty and suitable for travel.

GIVES AN IDEAL ROAD SURFACE

The above method gives an ideal road surface, and with traffic and wear it will always maintain a large part of the roughness of a perfect macadam road as compared with the smoother and polished surface of the asphalt. It is relatively as smooth as asphalt, yet the coarse particles of the surface hold moisture and dust longer, and the pavement will always be less slippery, less dusty, and can be made more durable than any bituminous pavement previously laid. Under considerable traffic, I believe, it is as durable as a block stone pavement made of the same stone. While the coarse stone in the pavements prevents cutting up under traffic in summer of the bitumen and the larger amount used, as compared with the voids to be filled, provides a surface more elastic and not as hard on horses, while fully as pleasing for pleasure driving.

The click from the horses' hoofs is much reduced as compared with asphalt, and the pavement is one of the most noiseless in use. This is specially noticeable in cold weather, when all bituminous pavements are the hardest and most resonant.

From the practical standpoint of an engineer, it can readily be seen that the rigid stone particles permit of: a, The reduction of voids; b, The use of a softer bituminous cement; c, A heavier coating of cement around each grain.

Each of these self-evident conditions will, in themselves, more than double the life and service of the bitumen itself. If the pavement fails it will be from other causes than the common reasons for failure of asphalt pavements as at present constructed, but might be from such causes as the following: a, The crushing or grinding of a

* The quick chilling of a bituminous cement causes inevitable lack of compression, and is the only reason why it is inadvisable to lay asphalt or bituminous pavement wearing surfaces in the coldest weather in winter.

† The safest way to regulate the temperature of the stone or mineral parts is to heat it in a rotary dryer, and while the dryer is running, maintain a constant feed to its full capacity, having the fire box of such size that a fire sufficient to overheat cannot be maintained. It is very practical to overcome all the possible causes of failure, but it requires experience to detect the causes and care to overcome them.

poor quality of stone under traffic; b, Carelessness in not properly placing the various sized elements of stone; c, Improper equipment and supervision induced by inconsistent economy.

The selection and method of preparation of bituminous cement used has naturally great relation to the life of any pavement. bitumen, as is well known, passes by almost insensible degrees from liquid to solid form, and may be tempered to any consistency. The softer the temper of any given quality of bitumen, the longer its life under any given amount of exposure. The softer the temper of the cement, the lower the melting point and the greater its flexibility at any temperature lower than its melting point. The length of time any given grade of bitumen will remain flexible and fill its office depends largely if not wholly upon the kind and condition of exposure.*

With natural hard bitumens or pitches, the process is to "cut back" the natural material with oil of various classes, to produce the softness desired. With natural soft bitumen the process is to extract a part of the natural softening oil.†

ESSENTIAL CONDITIONS

In order to maintain uniformity and enable one to improve and perfect any bituminous pavement, it is quite essential to have recourse to a chemical and physical testing laboratory, and to record all conditions present. Such a laboratory should not only examine materials to be used, which examination justifies an opinion of their combination or use, but, after a mixture or combination has been determined upon a sample should be taken daily, or at frequent intervals, and it should be separated into its parts and the actual conditions present in the mixture, as it is actually laid, should be carefully recorded, and the exact location where the particular sample is taken, should be noted.

This record acts in affecting the pavement in important ways. It gives a sure test of whether instructions are being followed, and makes every employee careful, for carelessness will surely be detected under this system.

It also provides a record of the exact conditions present, as the pavement mixture is actually laid, as against and to be compared with, the record of the exact kind and quality of the commercial materials directed to be used. This system has made it possible to lay fairly good bituminous pavements out of relatively poor bituminous cement, and under principles which have proven deficient. The record is an invaluable aid in measuring the change in the physical condition of the wearing surface, and the bitumen itself under exposure to weather.

It is far easier and more practical to measure the changes that take place by physical than by chemical tests. It becomes important, however, to know the nature of the bitumen and so use it as to prevent the changes from taking place.

The bitumens vary a great deal in their crude state in many different and varying physical and chemical properties. The essential chemical differences that can be detected are varied proportions of oxygen, hydrogen and carbon. The presence of varying quantities of non-bituminous substances such as free carbon, sand, clay, loam, vegetable matter, lime, soluble salts, acids, sulphur, etc., can be detected by analysis and may indicate the danger encountered in its use. The relation of the atoms of oxygen, hydrogen and carbon to each other, as it effects the physical condition of the bitumen, has never been definitely determined. It is known, however, that the process of hardening is the liberating of a larger part of the hydro-

gen atoms than of the oxygen atoms, or the taking up of oxygen from the air, which in itself brings about a rearrangement of the atoms and a consequent change in the physical properties of the cement or bitumen itself.

The physical condition does not change except on exposure to the elements, and as stated, the life and stability of a given bitumen depends entirely on the quantity of atoms exposed and on the extent of the exposure. In solid bulk in nature the change is so slow as to take centuries or ages to change a soft bitumen to a hard one, and the presence of oils are often indicated by the outcropping of asphalt or tar in the surface.

The important physical tests as applied to bitumen are relative only. The important tests are: a, for flexibility; b, for viscosity; c, for brittleness; d, for ductility; e, for adhesiveness; f, for range of temperature between its liquid and brittle point; g, for aging effect of a given amount of exposure; h, for amount of volatile oils; i, for effect of water on exposure.

It is of course necessary to make the tests under exactly similar conditions in order to have them of any value. An intelligent consideration of such physical examinations are a fair index to the value of the bitumen, but one must have learned by experience the effect of the varying conditions in order to accurately judge of their relative importance, and in order to apply the information to a pavement in practice, it is necessary to correctly arrange for its use with the mineral or non-bituminous matter.

It enables one to estimate with a reasonable accuracy the probable life of a bituminous pavement under the particular conditions present on the particular street where it is used.

THE RESULTS OF TESTS

The estimation of life should, of course, be considered in connection with tests made on the crude material used, on the cement itself, and the completed pavement wearing surface, and can only be considered in connection with a large volume of tests made on pavements at various stages of their life. The results of such tests mean nothing to anyone who has not in practice become familiar with the detailed conditions present in a large quantity of good, medium and defective work.

The consideration of a very large volume of such information led to the adoption of the principles of the bituminous macadam, in the effort to overcome all of the weak points of the asphalt pavement. Whatever opinion may be held of the efficiency of the completed roadway there can be no possible question but that in it 95 per cent. of the causes of complete or partial failure in asphalt pavements have been overcome.

If new cases of failure not now appreciated are to be encountered, they have not yet come to light, and on every known theory or principle that can be applied to the subject, the pavement is already established as to its value from both a scientific and a practical standpoint. The records maintained will aid greatly in overcoming any possible defects, and enable the incorporation of improvements from time to time in the grading and adjusting of sizes of particles and will suggest improvements in methods not known or in vogue in bituminous pavement construction.

There are no established methods of testing bituminous cements or mixtures, which are generally available and recognized by engineers. Unless the engineer has had practical and extended experience in the manufacture, use and testing of bituminous materials, his only safe method of getting good work is to specify what is wanted in such detail that, in some direct or indirect way it carries with it the use of one or more good established materials as used by an experienced party or parties.

It is unfortunately true that the experts are few and far between and that the amount of fair competition which is desirable to the engineer in bituminous materials or work, is often difficult to obtain. This is largely due to the fact that the business has been developed in secrecy by interested parties who are generally manufacturers or contractors and have frequently never themselves studied the scientific reasons, and whose sole success depends on having, on practical experiment and use, happened to strike a combination or mixture which gives greater success than the mixture of some competitor. Under these conditions the engineer is often led to believe that "white is black and black is white," and he often attributes the

* It does not depend upon traffic, as is generally supposed, except that in imperfect mixtures containing many voids, a certain amount of traffic is essential to keep an enamel on the surface, which alone protects the bitumen in the body from attack in such minute sections that failure would otherwise occur much easier. With certain forms of bitumen which in their natural state contain soluble salts, the pavement if it is kept wet, cannot provide the enamel and the traffic which on a dry pavement would add to its life, simply acts to rub off the disintegrating surface and causes its early destruction.

† All other things being equal, the process of cutting back the bitumen injures its physical quality. With some forms of bitumen, however, it may be advisable to substitute a good permanent oil or softening flux, for an inferior oil present in nature. The general practice in "cut back" cements is to remove an oil of great value commercially, and of value to the cement, and substitute an inferior oil of little commercial value. It is seldom that it occurs that any crude bitumen, as it is found in nature, is in the best state of flexibility for use for any purpose. It is sometimes used in its crude commercial state, but it is generally deficient in some one or more essential properties.

success to the quality of the material used when it is properly attributable to the method of its use or the intelligence and experience of the user or manufacturer. It is safe to say that almost every initial failure in the use of any bituminous material is due almost entirely to the method of use, for hardly any crude bitumen is so poor that it cannot be made into a cement under proper treatment, so that it will appear for a time almost equal to the very best that could be produced. So sensitive are the bitumens to improper treatment that it oftens happens a relatively poor bitumen owing to more intelligent treatment will prove better in the completed work than the better grade used under more haphazard or unscientific methods.

COMMON ERRORS

It is the common practice among engineers and contractors to place too much importance on the particular variety of asphalt or bituminous cement to be used, and too little importance on the reputation and professional ability of the expert. This practice is partially justified from both the engineer's and contractor's standpoint because most every known grade of bituminous cement is an individual monopoly in itself and is sold by brand or name under the competitive system; the only possible way for the engineer to be sure to get an experienced contractor is to specify the materials he knows to be controlled by the experts doing business in his section, and the successful contractor in turn holds his business by the successful use and development of the material which he monopolizes.

The abuse of this practice sometimes leads the unscrupulous con-

tractor to trade on his reputation in other lines and abuse the confidence reposed in him by the engineer, and we often find materials specified for work which are vastly inferior to the best available for a particular purpose, and which cost more money than the better material.

The power to refuse to award contracts at unreasonable prices can always be used with a contractor to keep him within reason as to price and to prevent combinations among contractors if two or more materials are specified. Combinations are often made among contractors to prevent unjust competition and maintain a fair price and, when forced, the city often pays a higher price or gets inferior work than when dealing with one contractor alone. The contractor's side of the matter if he happens to be one of experience and is trying to enter a new field is that some of the monopolies in the bituminous and paving lines are a national strength and of such tremendous magnitude that they will crush out a new competitor in an allied line if given an opportunity. So called competition then ceases to be competition but a "cut throat" policy to drive competitors to the wall and establish a monopoly.

To meet this condition, I think the engineer or official is on the highest moral grounds justified in paying a reasonable price to a legitimate contractor, rather than permit his annihilation and financial failure, or force him to combine with his competitors by forcing him through unreasonable competition into a position where they must combine or succumb.

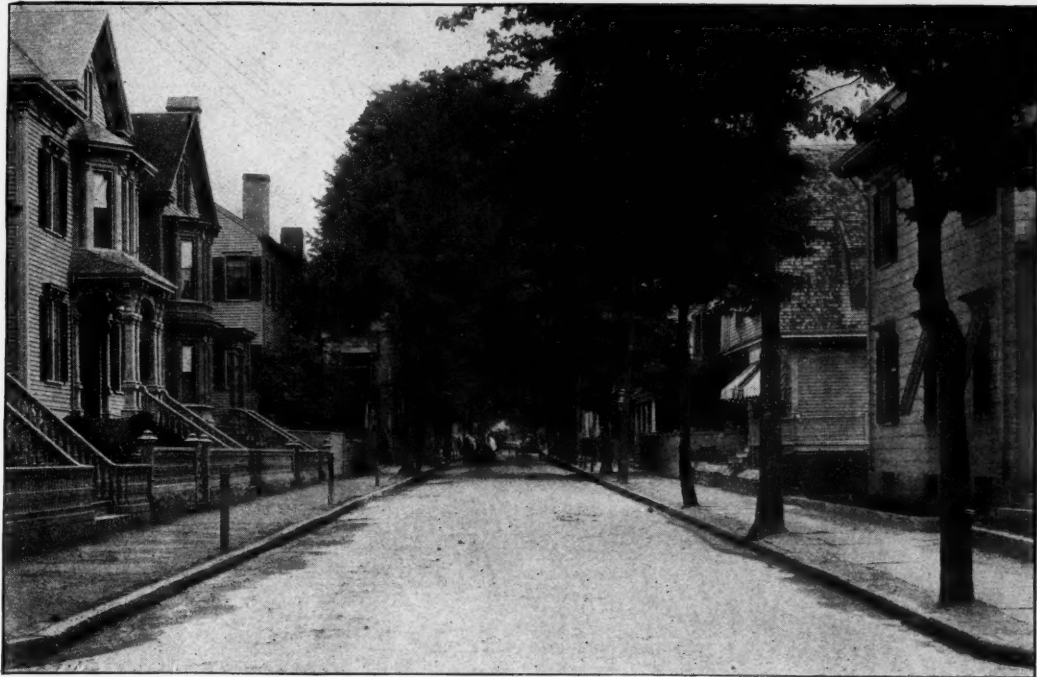
EDITORIAL COMMENT.

WHEN Prof. A. W. Dow, government inspector of asphalt and pavements, of Washington, D. C., speaks well or ill of any kind of an asphalt pavement, his comment is worthy of consideration. For this reason we took occasion to verify a recent press report, which made him say: "Basing my opinion on what I have seen of this pavement, it exceeds in good qualities any pavement I have ever seen laid." In reply to our inquiry as to whether he had been correctly reported, he answered affirmatively. Mayor Smyth of Charleston, City Engineer Southgate and Mr. George W. Stainback, chairman of the Board of Public Works, of Nashville, Tenn., spoke in equally high praise of the sample of bituminous pavement which was recently laid in Charleston, and confirmed the press report. The ideal pavement has not yet been invented, but it would appear from the above opinions that this is an improvement over any other now in use. This new pavement is described at length in a paper read by Mr. Fred J. Warren, the patentee, before the recent meeting of the Boston Society of Civil Engineers. The paper is published elsewhere in this number. It is to be expected, of course, that Mr. Warren should believe in his own invention, but it is not reasonable to suppose that he is going to claim the impossible for his pavement and so destroy the good effect of a reputation as an asphalt and paving expert, which has been gained at the expense of twenty-five years of unremitting study and experience. It is well, however, notwithstanding the favorable criticism of Prof. Dow and others, for city officials to be conservative in their expressions and judgment. While the experts who have examined this pavement speak in the highest terms of the principles involved in its construction, and while its first year's use has shown no defects, it still remains a fact that the element of time has not been fully reckoned with. Five years' wear will supply the remaining evidence that is required to prove this pavement the best yet invented.

STATE ENGINEER BOND, of New York, asks for a million dollars for good roads for next year. To some people this may seem like an enormous sum of money to be devoted to the general betterment of public highways, but it is none too much to meet the demands of

the times. We are living in the twentieth century and we should begin to adapt ourselves to twentieth century responsibilities. There is none greater than that which demands the improvement of roads throughout the Empire State. Last year the Province of Ontario appropriated one million dollars for the betterment of its highways. New York State should equal, if not exceed, the liberality of this Canadian province. A full description of Ontario's methods of road improvements was given in our January issue. It is high time that parsimony and old fogysm should be relegated to the rear by our State legislators when treating this question. The Empire State is immensely rich. Its debt, comparatively speaking, is a trifling one. Its tax rate is low and it has few material interests so essential to the comfort and welfare of its people as the improvement of its highways. What is true of the Empire State is true of nearly every State in the Union. There should be an advance all along the line during the next year. With the introduction of modern road making appliances for the same sum we are able to get fifty per cent. better results to-day than was possible twenty-five years ago.

THE State of Minnesota is to have a new tax law. It will contain a number of important provisions which will greatly benefit the cities in that State. The new code will abolish the town board of review, but retains the town assessor. It will require assessors to view property which they assess, and taxpayers to list their property under oath at its true value. It will require exhaustive reports from all public service corporations, and will leave the gross earnings tax on railways intact. It will assess all street railways on an ad valorem basis, requiring a full statement from the company to which the assessor is to add the value of the franchise. Furthermore, it will require the assessment of gas, water, electric power, wharf, and boom companies on their franchises, arriving at the values thereof by deducting from the stocks and bonds the value of the real and personal property. If the proposed bill becomes a law the tax burden, particularly in cities of that State, will be more equally distributed. The corporation will have less opportunity for evading its just proportion of taxes.



WARREN'S BITUMINOUS MACADAM WATERPROOF PAVEMENT.
5TH STREET, NEW BEDFORD, MASS.



Executive Department.
MAYOR'S OFFICE.
NEW BEDFORD, MASS.

New Bedford December 31. 1901.

Messrs. Warren Brothers Company.

143 Federal st.,

Boston, Mass.

Gentlemen:-

In reply to your request for statement in regard to the New Bedford pavements laid with your Bituminous Macadam Waterproof Pavement, I beg to say that the work done seems to be very durable and satisfactory, with the exception of a small part of one block on 5th Street, where we undertook to lay the surface without scarifying the old Macadam base. The balance of the five blocks laid is very satisfactory.

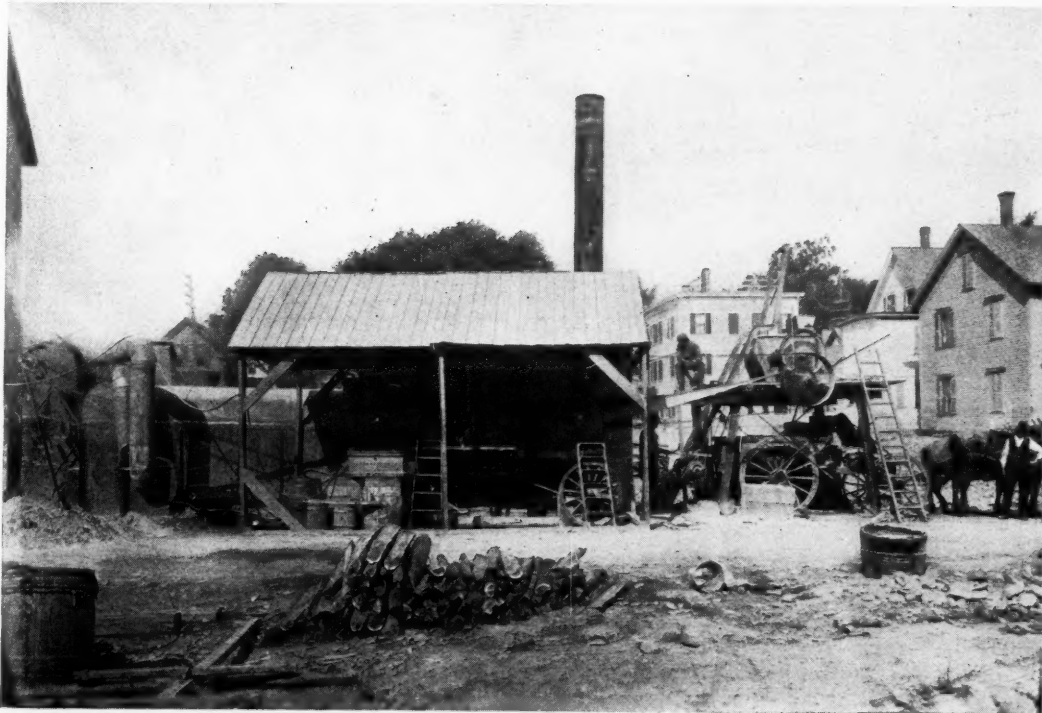
The top has moved slightly where it was not laid on a rough foundation

This however, only illustrates the importance of having work done by parties who are following the business and know the causes of failure, so as to be able to avoid them in the future.

I feel surely that you have a pavement with great economic value, and one which is sure to bring to you a large amount of business.

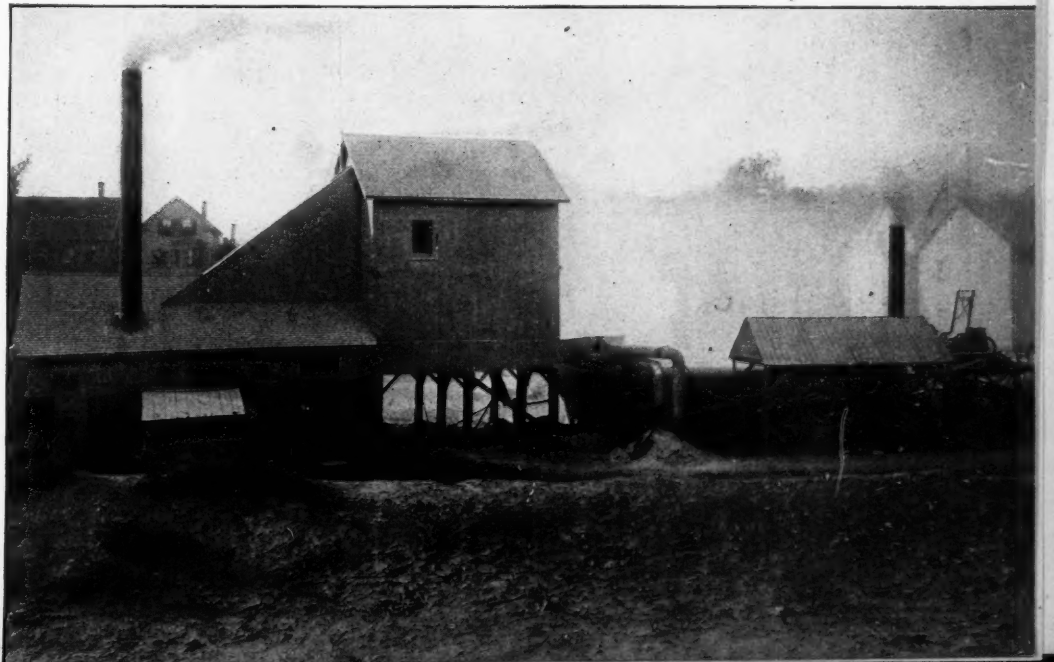
Yours respectfully,

Chas. S. Ashley
Mayor and President of Board of Public Works,
and Pres. of League of American Municipalities



PORTABLE BITUMINOUS
MACADAM PLANT.

WARREN'S BITUMINOUS MACADAM
WATERPROOF PAVING PLANT AND
CRUSHER ATTACHED.



OFFICE OF
SUPERINTENDENT OF STREETS
BROCKTON, MASS.

December 27, 1901.

Messrs. Warren Brothers Company,
143 Federal Street,
Boston, Mass.

Gentlemen:-

After a careful investigation of your Bituminous Macadam Waterproof Pavement constructed at Pawtucket, I decided that it was a desirable pavement for this city.

We started to lay the pavement in the latter part of October, and laid East Elm Street from City Hall to Main Street, and three short sections of Main Street, under your expert advice, and with labor and materials furnished by the city, you furnishing the bituminous composition and loaning us the necessary mixing plant.

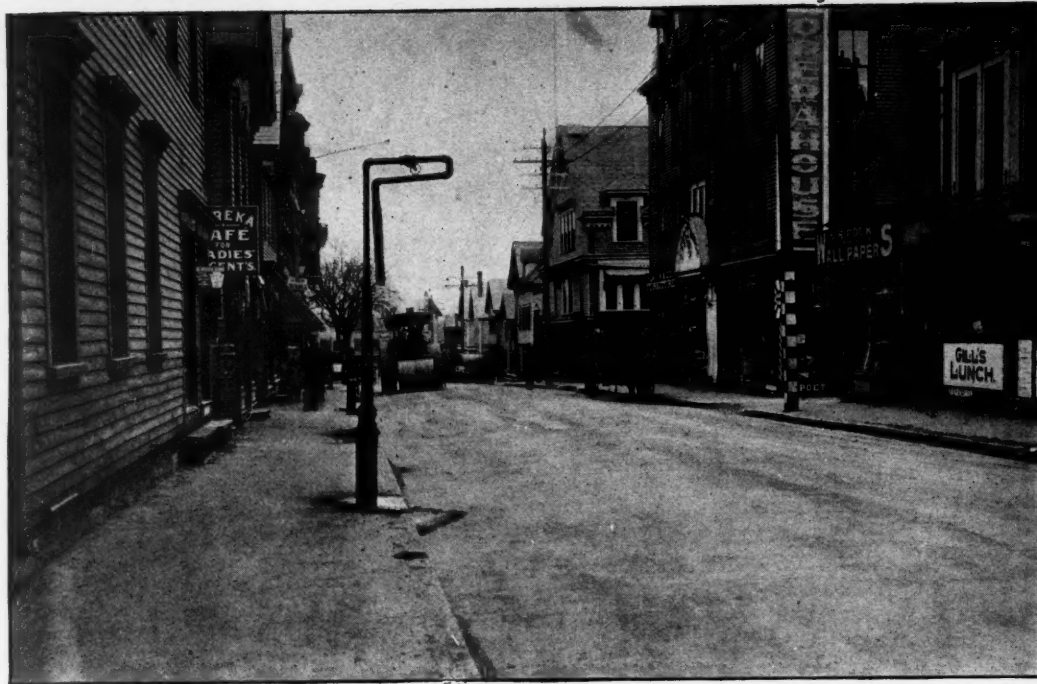
Elm Street is a roadway twenty-seven feet in width, without car tracks. Main Street, which is our heaviest travelled street, has a double street railroad track, so that the space between tracks and curb is only twelve feet in width, but the bituminous macadam pavement is laid between as well as outside the rails. Both streets are subjected to quite heavy business travel. We had planned to lay more of the work last fall, but were prevented by the cold weather and snow in November.

The pavement is proving quite satisfactory, and it has received very general commendation from our citizens and officials, both while in course of construction and since completion. The surface, while similar to asphalt and nearly as smooth, affords a good foothold and is not slippery in wet weather. The pavement is even more noiseless than asphalt, and seems to combine the best features of asphalt and macadam and to overcome the slipperiness and objections of and at less cost than asphalt.

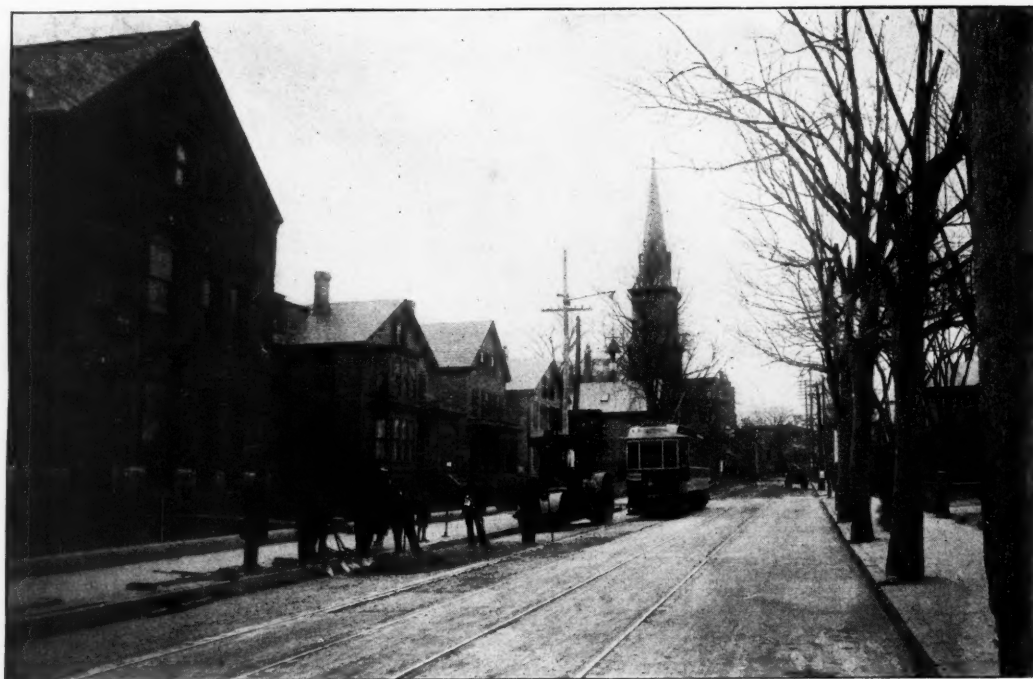
The plant which you loaned us for constructing the work was very satisfactory.

Yours respectfully,

W. B. Smith
Superintendent of Streets.



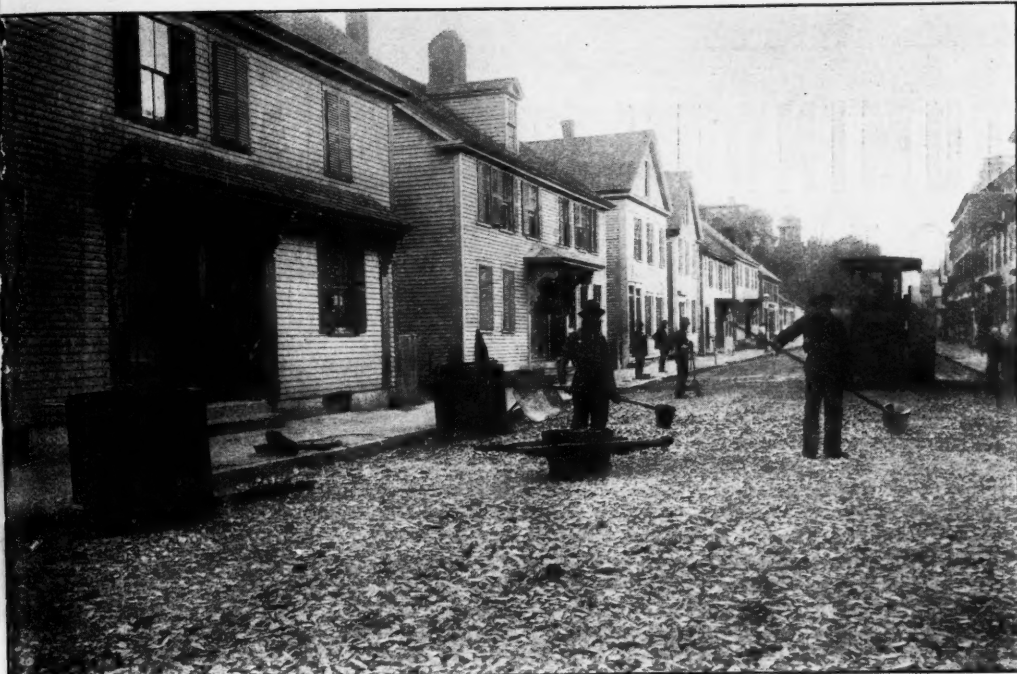
ELM STREET, BROCKTON, MASS.



MAIN STREET, BROCKTON, MASS.



AROUND CITY HALL,
BROCKTON, MASS.



PREPARING THE FOUNDATION.

Board of Public Works of the City of Woburn.

WILLIAM F. DAVIS, Mayor, *President, Ex-Officio.*

ELWYN G. PRESTON, Commissioner of Water and Water Supply, *Vice-Chairman.*

GEORGE E. FOWLE, Commissioner of Public Buildings and Grounds.

MICHAEL J. KENNEDY, Commissioner of Streets.

PHILIP M. DOWNEY, Commissioner of Sewers.

FRANK B. FRENCH, Engineer and Superintendent.
JAMES HARTY, Clerk.

Woburn, Mass., December 21, 1901.

Messrs. Warren Bros. Company,

#143 Federal Street,

Boston, Mass.,

Gentlemen.-

I wish to say that during the present year I carefully inspected the pavement under construction by your Company at Holyok and Brockton, Mass. which inspection convinces me of its value as a durable street surface and that you have the right idea as to method of laying.

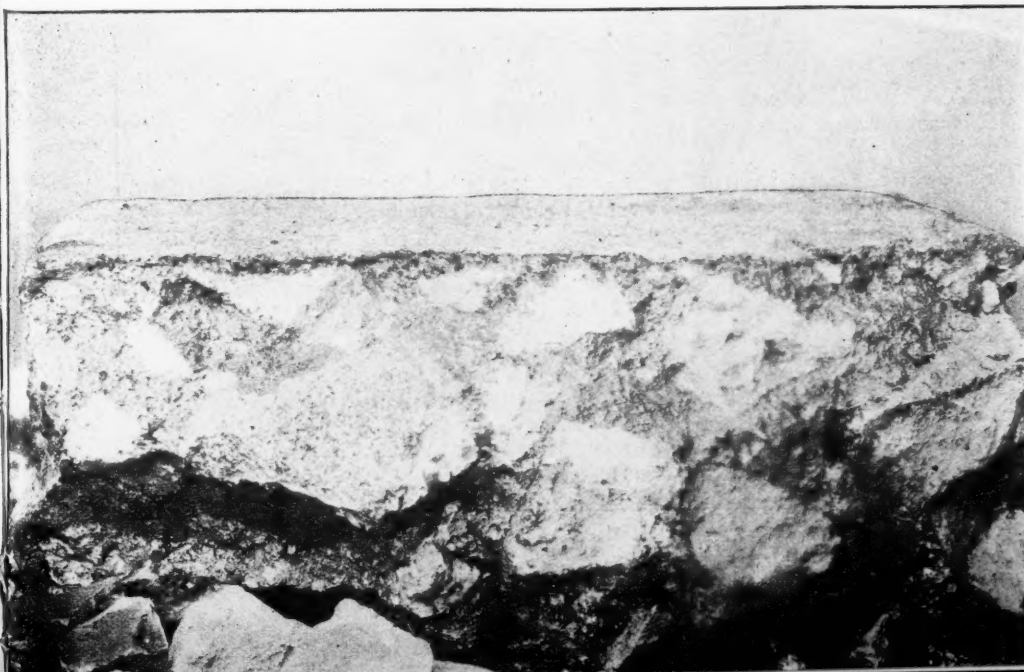
Very respectfully yours,

Frank B. French,

Engineer & Sup't. Bd. of Pub. Works.



LAYING THE PAVEMENT,
CAMBRIDGE, MASS.



SECTION OF PAVEMENT
CUT FROM MAIN STREET,
CAMPELLO, MASS.

WARREN'S BITUMINOUS MACADAM WATER-PROOF PAVEMENT

WHAT IS IT?

IT IS THE BEST PAVEMENT IN THE WORLD TO-DAY. ITS CHEAPNESS IS ONLY AN INCIDENTAL FEATURE OF ITS ADVANTAGES.

WHY?

1st. BECAUSE it is made of hard stone (the most durable of materials) cemented together with a flexible and very durable bituminous mortar, forming a solid waterproof bituminous concrete. The proportions of the bituminous cement and of the several sizes of particles of stone are such that, when compressed, the mineral aggregate has the greatest possible density and the least possible voids, with each particle thoroughly coated and the voids thoroughly filled with the bituminous cement.

WARREN'S PURITAN BRAND BITUMINOUS MACADAM COMPOSITION

—the natural stone takes the wear and the bituminous mortar binds the particles together.

2d. BECAUSE it affords the best surface ever devised for horses' feet, affording nearly as smooth a surface as the ordinary asphalt pavement and one which is more flexible and elastic, and which, therefore, affords a better foothold and makes a more noiseless pavement.

A WELL LAID CRUSHED STONE MACADAM PAVEMENT SEEMS GOOD ENOUGH WHEN NEW, BUT YOU CAN NOT KEEP IT SO.

WHY?

1st. BECAUSE it is not waterproof and rain washes tons of it away.

2d. BECAUSE traffic soon grinds it into powder and the wind blows tons of it into adjoining yards and houses.

3d. BECAUSE the particles of stone are only partially bound together with finer particles of stone, so that traffic early displaces the stone and causes the surface of the pavement to wear into ruts and holes.

4th. BECAUSE it cannot be cleaned with a street sweeper, which will only remove a portion of the mud and plaster the balance on the surface.

5th. BECAUSE if there is any considerable traffic all the above causes make the pavement very costly to maintain.

ON THE OTHER HAND.

WARREN'S BITUMINOUS MACADAM WATERPROOF PAVEMENT is like tough rubber, and each piece of stone or sand used in the wearing surface is incased in bitumen, and the whole is welded together into one homogeneous flexible concrete.

WATER CANNOT WASH IT AWAY.

WIND CANNOT BLOW IT AWAY.

THE FLEXIBILITY OF THE BITUMINOUS MORTAR PROTECTS THE STONE; PREVENTS IT BEING GROUND INTO POWDER AND GIVES IT THE MOST FAVORABLE CONDITION POSSIBLE FOR RESISTANCE TO WEAR OF TRAFFIC.

IN OTHER WORDS, IT IS A CONCRETE.

An asphalt pavement surface is composed of a bituminous MORTAR (sand and bituminous cement).

Ours is a bituminous CONCRETE—i. e., particles of crushed stone cemented together with a flexible bituminous mortar compressed with a very heavy steam roller into a solid mass with no interstices or voids, and the particles of stone firmly held together with a rubbery waterproof cement that causes the whole mass to be both resistant and elastic.

Write for illustrated pamphlet and for any further information desired.

WARREN BROTHERS COMPANY

143 FEDERAL STREET, - - - BOSTON, MASS.

MUNICIPAL JOURNAL AND ENGINEER

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VOLUME XII

NEW YORK, MARCH, 1902

No. 3

THE MOST BEAUTIFUL CITY IN THE MIDDLE WEST

Some Things Which Are Needed—Police and Fire Departments Liberally Supported—Fine Park and Boulevard System
—Street Cleaning System Better Than New York's—Excellent Streets

By the Editor

THE average visitor to the city of Detroit generally leaves with the impression that it is the most beautiful city in the Middle West. Its streets are broad, well paved, kept in good repair, flanked with numerous shade trees and kept cleaner than any other city in the United States, not excepting New York. Possessing these good points it will be readily understood why the casual observer obtains so flattering an opinion of this Michigan city. When this municipality and its affairs are inspected more closely, however, it does not require the aid of a microscope to discover some of its defects. These do not change the fact that, taken for all in all, it is the most beautiful city in this section of the country.

Some Things that Need Correction

Most of the ills which now afflict Detroit are due to an imperfect State municipal code, its defective charter and partisan politics. It has had recent experience with so-called "ripper" legislation, but nothing in comparison with that of some other States; for instance, Pennsylvania and Ohio. The State Legislature of last year "ripped" out three old commissions—board of public works, park and police—of three members each, replacing them with one-man commissions. While this action was wrong in principle, it appeared to be the only way to rid the city of some alleged evils existing in the Board of Public

Works. In this particular instance the end would seem to justify the means.

That the municipal code of the State of Michigan needs revision there can be little doubt, for the reason that it unjustly and unwisely encroaches upon the privileges of home rule. If it were merely a matter of sentiment it would be all right to permit the present code to continue, but when any corporation, such as a telegraph, telephone or electric light company, can go to the State authorities and obtain permission to string its wires overhead or lay them underground, in a city like Detroit, without the permission from the city authorities, a great injustice is done. While the civic administration has tacitly given permission for various companies to do business within its limits when they have come from the State authorities, yet it is impossible to prevent the entrance of any such

company if the State should so will. Out of this has grown an evil which is a menace to the streets of the city and is sure to increase the burden upon the taxpayers annually. The civic authorities and reformers are in part to blame for this condition. As a result, every telegraph, telephone and electric light company, including the municipal plant, constructs and operates its own system for laying wires underground. This means that each company must occupy its own particular position in the streets and that when its conduit is constructed or re-



THE CITY HALL

paired the streets must be torn up for a longer or shorter period. No matter how carefully any pavement is replaced, it is a well-known fact that this shortens the life of a pavement more than extraordinary traffic. To any well-conducted city this way of doing things will be considered exceedingly bad practice.

But the city has many excellent features. Its various departments, as a rule, are liberally supported and their affairs faithfully adminis-

The Board of Public Works

The "ripper" legislation, which supplanted the three-man board with a one-man commission, without doubt was a step in advance. As evidence of this fact, the aggregate estimate for appropriations for the three commissions amounted to one-half a million dollars less this year than last, when the departments were under the control of the three-man board. Another point gained was the selection of

POPULATION, AREA AND ASSETS OF THIRTEEN CITIES

	Popu- lation.	Area, acres.	Cash in treasury.	Cash and bonds in sinking fund.	City hall.*	Police department.*	Fire department.*	Schools.*	Libraries.*	Parks.*	Total assets.
Cleveland, O.	381,768	21,190.00	\$4,924,289	\$2,607,596	\$48,000	\$465,810	\$779,000	\$4,950,507	\$185,506	\$7,478,000	\$38,894,226
Buffalo, N. Y.	352,387	32,599.54	769,247	1,205,412	1,607,400	427,484	965,782	3,667,304		3,661,155	24,902,948
San Francisco, Cal.	342,782	77,520.00	656,305	208,169	7,540,000		1,656,000	5,415,200		12,000,000	29,905,356
Cincinnati, O.	325,902	22,560.00	1,387,915	5,579,894	1,863,441	193,000	1,278,775	4,251,668	835,000	1,500,000	67,138,307
Pittsburg, Pa.	321,616	19,418.17	6,779	5,446,071	945,000	217,317	1,037,924	3,921,051	1,273,773	3,603,870	30,349,244
New Orleans, La.	287,104	126,080.00	175,937		180,000	14,500	362,900	1,259,500	115,000	2,208,000	15,729,932
Detroit, Mich.	285,704	18,700.00	1,092,492	1,965,280	2,140,430	288,030	1,634,971	3,195,005	548,000	6,588,970	27,212,621
Milwaukee, Wis.	285,315	14,400.00	450,847		1,200,000	237,227	1,021,272	3,242,657	1,079,000	2,625,339	19,412,368
Washington, D. C.	278,718	44,320.00	2,223,549	537,426		148,795	425,021	4,576,174	20,000	300,000	12,205,793
Newark, N. J.	246,070	11,840.00	176,415	4,295,359	145,000	150,000	750,000	2,426,375	505,000	5,073,234	25,561,000
Jersey City, N. J.	206,433	7,731.20	622,397	3,028,934	900,000	148,000	362,535	1,732,650	340,463	528,500	17,479,731
Louisville, Ky.	204,731	12,800.00	309,370	2,119,298	530,000	52,300	498,000	1,393,600		1,050,000	16,061,245
Minneapolis, Minn.	202,718	34,105.60	409,817	1,872,115	1,306,122	93,052	436,722	2,940,062	351,626	4,587,258	19,324,765

† Cash on hand at end of fiscal year must be returned to United States Treasury and made available again only by act of Congress. * Including land, building, apparatus, etc. ‡ City owns land and one-half of building. ¶ Included in city hall.

tered. Its municipal water and light plants, of which a more extended description will follow, are among the best in the country. Partisan politics, as in most cities, injures the administration of these departments to a certain extent, but as in most other cases, the tendency leans toward reform in this matter.

The Hon. William C. Maybury is now serving his seventh year as chief executive. He has been elected by the people for three successive terms, of two years each. The "ripper" legislation, which

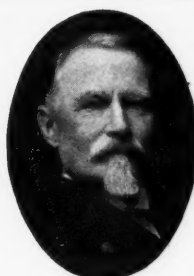
Mr. D. W. H. Moreland to act as the commissioner. Mr. Moreland is a man of striking personality, with a rare executive ability and a forceful and rapid way of dispatching the city's business. His responsibilities are great, but if any mistakes are made it is easier to locate the cause with one man in charge than with three. With a competent corps of assistants including the services of Secretary Ogg, the affairs of this department can be more effectively administered than when the responsibility is divided among three.



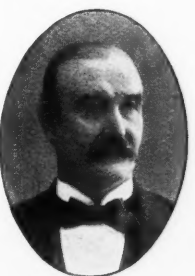
THE ASPHALT PAVEMENT ON CASS STREET

created the one-man commissions, at the same time extended his term of office one year. While his administration has not been characterized by the forcible and erratic peculiarities of his predecessor, the late Governor Pingree, nevertheless, it is his strong personality which has won him this place as a Democrat. He has not only had the support of his party, but of many independent Republicans. The next election will occur in the fall. It is too early for the announcement of candidates, but it is more than probable that if Mayor Maybury chose to run again he could be elected.

This is not Mr. Moreland's first connection with this department as he was one of three during a previous period. Several unique methods have originated with him. For instance, on his recommendation, enameled signs with a white lettering on a blue enameled background, with the following words, "Please do not spit on the sidewalk," were posted up at street corners all about the city, particularly in the business section. Although no penalty was attached and it was a simple request, Detroiters have formed the habit of going to the curb whenever expectoration has been necessary. As a con-

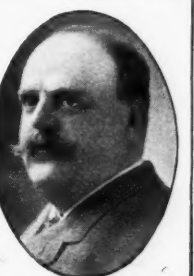


Police Com. Fowle (beginning at right at top), Park Com. Bolger, Com. Moreland of D. P. W., City Clerk Schmid, Chief of Police Downy, Fire Chief Kennedy, Secy. Ogg of D. P. W., Secy. Hatch of Light Com., City Engineer Ferguson, Health Officer Kiefer.



sequence the sidewalks of the business portions of Detroit present a much more cleanly appearance than is found in other cities. For years the city has made it a practice to keep all sidewalks in repair at its own expense, excepting when a sidewalk is to be relaid entirely. Mr. Moreland provided a quick repairing outfit, which consists of a horse and wagon, equipped with the necessary tools and materials for doing repair work. As soon as an inspector, or any other person, reports to the department of public works that a plank is missing or a sidewalk is defective this wagon is sent out post-haste and the repairs made immediately. In this way the city is saved, annually, thousands of dollars in damage suits. It is a good practice for other cities to follow.

Shortly after the "white wings" were organized by Colonel Waring to clean the streets of New York, Mr. Moreland, who was then in charge of the street cleaning of Detroit, introduced the system in that city. The organization is more complete and efficient than that of New York at the present time. Hundreds of miles of streets and alleys are kept clean the year round. Dirt, refuse and filth are taken care of and this part of the municipal house cleaning has been performed in the most thorough manner. Most of the "white wings" are Italians. Excellent discipline is maintained. The men are obliged to keep their white uniforms and helmets in perfect condition and have their shoes blacked every day. They are not permitted to smoke while on duty. They are not allowed to enter saloons during working hours. They are not permitted to speak to any person



STREET CLEANING STATISTICS

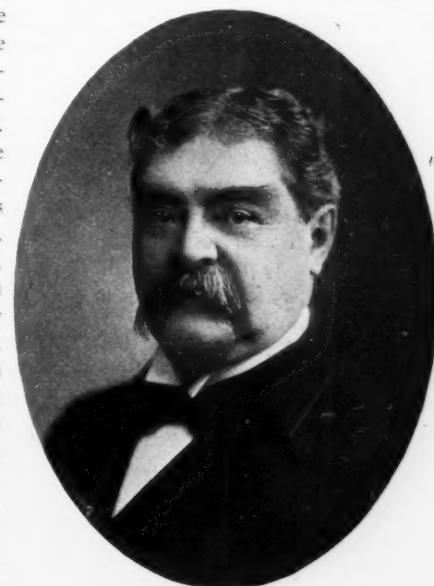
	Swept by hand or machine.	Swept by city, sq. yds. per week.	Persons employed by city.	Cost of maintenance.
Cleveland, O.	Both			\$55,657
Buffalo, N. Y.	Both	3,590,400	57	178,310
San Francisco, Cal.	Both			167,906
Cincinnati, O.	Both	6,000,000	197	199,641
Pittsburg, Pa.	Both	9,000,000	400	157,823
New Orleans, La.	Hand	2,400,000	175	120,303
Detroit, Mich.	Both	5,110,026	257	157,196
Milwaukee, Wis.	Both	9,400,000	400	179,599
Washington, D. C.	Both	1,750,000	79	174,679
Newark, N. J.	Both	2,132,054	300	123,747
Jersey City, N. J.	Both			† 62,773
Louisville, Ky.	Both	2,100,000	128	† 102,899
Minneapolis, Minn.	Both	10,000,000	420	170,091

* For six months no sweeping. † Including garbage removal.

while on duty nor to answer questions. The third offense in disobeying the rules and regulations means dismissal from the department. It cost \$161,440.58 to maintain the department last year. This was under the three-man commission. Although the department has been returned to Mr. Moreland's care in a somewhat demoralized condition, he expects to maintain it at a less cost during the coming year than during the past.

The "white wings" are equipped with brushes and push carts, the latter being supplied by the Chapman Manufacturing Company, 508 East Nineteenth street, New York; the machine street sweepers by The F. C. Austin Manufacturing Company, of Harvey, Ill., and William C. Oastler, 43 Exchange place, New York. A fifteen-ton roller, which is used by the department, was also supplied by Mr. Oastler, and a seven-ton roller by the Pioneer Iron Works, of Brooklyn, N. Y. The sprinklers used by the department were purchased from Studebaker Bros., South Bend, Ind., and F. C. Austin Manufacturing Company, of Harvey, Ill.

The cleanliness of the city has largely been brought about by educating the people. As in every other city, the average citizen formerly threw his waste paper, peanut shucks, fruit peels, etc., into the street; now he consigns them to the receptacles provided for that purpose. Simultaneously with the organization of the "white wings" the use of the "litter barrel" was introduced, and one placed on every corner of the down town section and at convenient intervals throughout the city. The newspapers came to the assistance of the department and urged both old and young to use these receptacles whenever necessary. Tons of refuse are collected every year from these barrels and the people have formed the habit of consigning all refuse matter to these receptacles. It costs much less, per ten thousand square yards, to clean the streets of Detroit than New York or any other city which approaches real cleanliness. Commissioner Moreland not only employs the "white wing" system, but uses modern

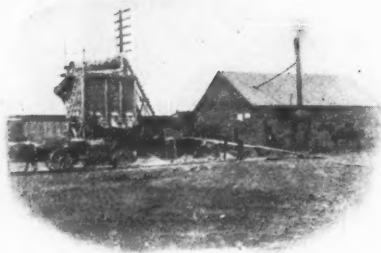


WILLIAM C. MAYBURY,
Mayor

STREET PAVEMENTS

	Miles of streets paved with				Total miles streets	
	Granite and Belgian block.	Brick.	Asphalt and asphalt block.	Macadam.	Paved.	Unpaved.
Cleveland, O.		79.30	11.20	.73	184.13	300.00
Buffalo, N. Y.	6.24	9.05	223.63	3.29	335.89	300.00
San Francisco, Cal.	90.88		80.82	175.00	366.91	383.00
Cincinnati, O.	47.00	40.00	23.00	193.00	386.00	244.00
Pittsburg, Pa.	88.47		90.10	21.90	257.04	230.00
New Orleans, La.	25.65	5.95	25.24		205.80	494.20
Detroit, Mich.	* 2.05	26.31	26.31	12.64	285.89	282.00
Milwaukee, Wis.	8.77	2.65	13.90	.45	310.93	210.12
Washington, D. C.	27.69	.52	125.77	34.40	231.65	47.67
Newark, N. J.	46.25	3.85	41.54	10.05	114.44	103.50
Jersey City, N. J.	75.78	.05	13.04	16.33	124.62	76.66
Louisville, Ky.	17.32	31.56	17.84	78.83	116.14	60.00
Minneapolis, Minn.	12.69	9.13	12.88	5.34	100.26	689.67

* Granite only.



CRUSHING STONE FOR CONCRETE

improvement and repairs than has been appropriated for the current year could be wisely expended. The practice of Detroit in continuing to lay the old cedar block pavement is in singular contrast to the progressive methods employed in other cities of its size. At the present time it has over 220 miles, out of a total of 285, of cedar block pavements. One hundred and thirty-six miles of this pavement is laid on a concrete foundation, 40 on plank and 49 on sand foundation. The city has 26 miles of brick pavement and 25 of sheet asphalt. Another singular fact about the paving situation in Detroit is that, besides the Park Boulevard, it has only a trifle over 9,000 square yards of Macadam pavement. About 200 miles are ordinary dirt roads. With a stone crusher, the requisite number of road rollers and other apparatus necessary for laying a good Macadam pavement, the city could lay its own Macadam roads at a profit. A comparison of pavements will be found in a table elsewhere. The sum of \$348,799 was appropriated last year for repaving, most of which was expended for that purpose. Besides this, Detroit has what is known as the General Road Fund, which is devoted to the improvement and care of the streets. Over \$300,000 were set aside last year for this purpose, most of which was expended. The city has an exceptionally fine sewer system. Up to date there have been laid 164 miles of trunk sewers and 327 miles of lateral or alley sewers. The work performed last year in extending and improving the sewer system cost \$139,398. The figures giving the total mileage of sewers in the city will be found in a table elsewhere.



LAYING CEDAR BLOCKS

THE ASPHALT REPAIRING PLANT

One of the questions which is agitating Detroit people at the present time is whether it shall install or not the asphalt repairing plant, the purchase of which was contracted for under the three-man board a year or so ago. Commissioner Moreland is decidedly not in favor of establishing the plant. Judging from the information which he has gathered from other cities, where plants have been employed and where contract work has prevailed, his conclusions would seem



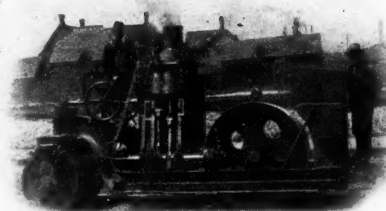
TARRING THE PAVEMENT

street sweeping machines, in fact, he uses every device that will in any wise contribute to the cleanliness of the city.

THE PAVEMENTS AND SEWERS OF DETROIT

While the pavements of Detroit are good and fairly well maintained, the casual observer is sure to notice where a larger sum for repaving,

the larger cities in the United States asking for information relative to the cost of asphalt repairing, whether performed under the contract system or by a municipal repairing plant. I received letters from Baltimore, Buffalo, Cleveland, New York, Boston, Philadelphia, New Orleans, Cincinnati, San Francisco, St. Paul, Minne-



SEVEN-TON ROLLER

apolis, Indianapolis, St. Louis and Winnipeg, Manitoba. Most of these cities have from eight to ten times as much asphalt to maintain as Detroit, and for this reason their opinions should be valued. The most pretentious asphalt repairing plant on this Continent is owned and operated by the city of Winnipeg, Manitoba. It is not only used for patching, but resurfacing the streets, and according to the information furnished by that city, the cost per square yard for this work was \$2.06, while we pay \$1.33 per square yard for repairing our asphalt pavements under the contract system. The City Engineer of Winnipeg said that he would not think it a profitable undertaking to maintain an asphalt plant which would be confined wholly to repair work; that it could not be run at a profit unless resurfacing were also included. St. Louis did have a plant, but I have a letter from the engineering authorities of that city which says that the plant was a monumental failure.

"To show that Detroit is receiving fair treatment at the hands of the asphalt people in the matter of repair work, I will quote prices per square yard at which asphalt repairs and resurfacing are done in the following cities: Baltimore, \$1.55; Boston, \$2.50; Chicago, \$1.42; Pittsburg, \$1.97; Cincinnati, \$1.47. In this connection it will be well to call attention to the fact that while Chicago's resurfacing costs \$1.42, with a six-inch concrete base replaced it costs \$2.12, as against Detroit's \$1.33, with nothing extra for replacing concrete in patching. Of course it is not often necessary to renew concrete, but when it is there is no extra charge.

"If Detroit installs this asphalt plant it will be well to understand beforehand what the fixed charges for its maintenance will be. For that reason I have had a careful estimate made, which includes salaries, cost of materials, etc., on the estimate that 15,000 square yards would have to be repaired per annum. On this basis the repairing of our asphalt streets would cost \$2.13 per square yard with the asphalt plant, as compared with \$1.33 under the contract price, as now operated."

The Department of Public Safety

There are few cities in the United States which are as liberal in their support of the Fire and Police Departments as the city of Detroit. Its liberality, however, cannot be boasted of in its support of the Health Department. The latter, unfortunately, has been greatly injured by the injection of politics into its administration. There is a fine building devoted to its interests, but the appropriation for its work amounted to only about \$31,000 last year. As compared with cities of its size and importance this is wholly inadequate. One of the first lessons which Detroit needs to learn is that to safe-guard the public health in every possible way is one of the important functions of a city government. The dangers and perils in city life, which have been multiplied by modern civic conditions,



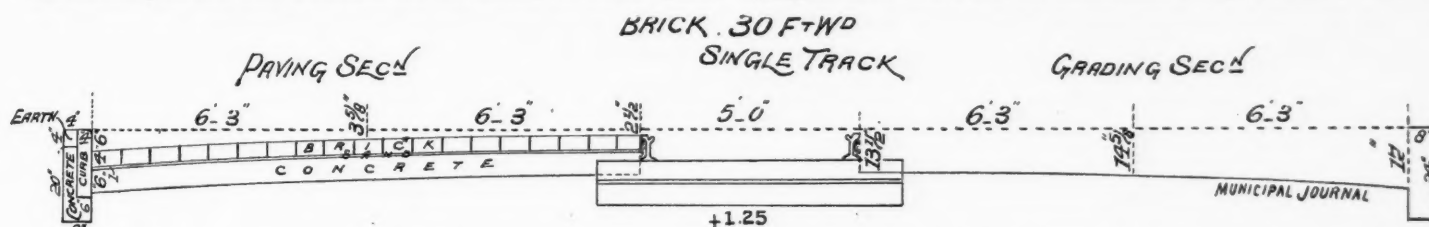
SAWING BLOCKS FOR PAVING

can be largely diminished through the efforts of a well-equipped and administered health department.

It is interesting to note in this connection, that despite the small appropriation, the present officials are able to give Detroit a good bill of health. Some innovations have recently been inaugurated by the department in public health work; for instance, under the direction of Dr. Kiefer, the health officer, a systematic investigation of ventilation of all public schools in the city has been started. The MUNICIPAL JOURNAL AND ENGINEER has advocated, for several years,

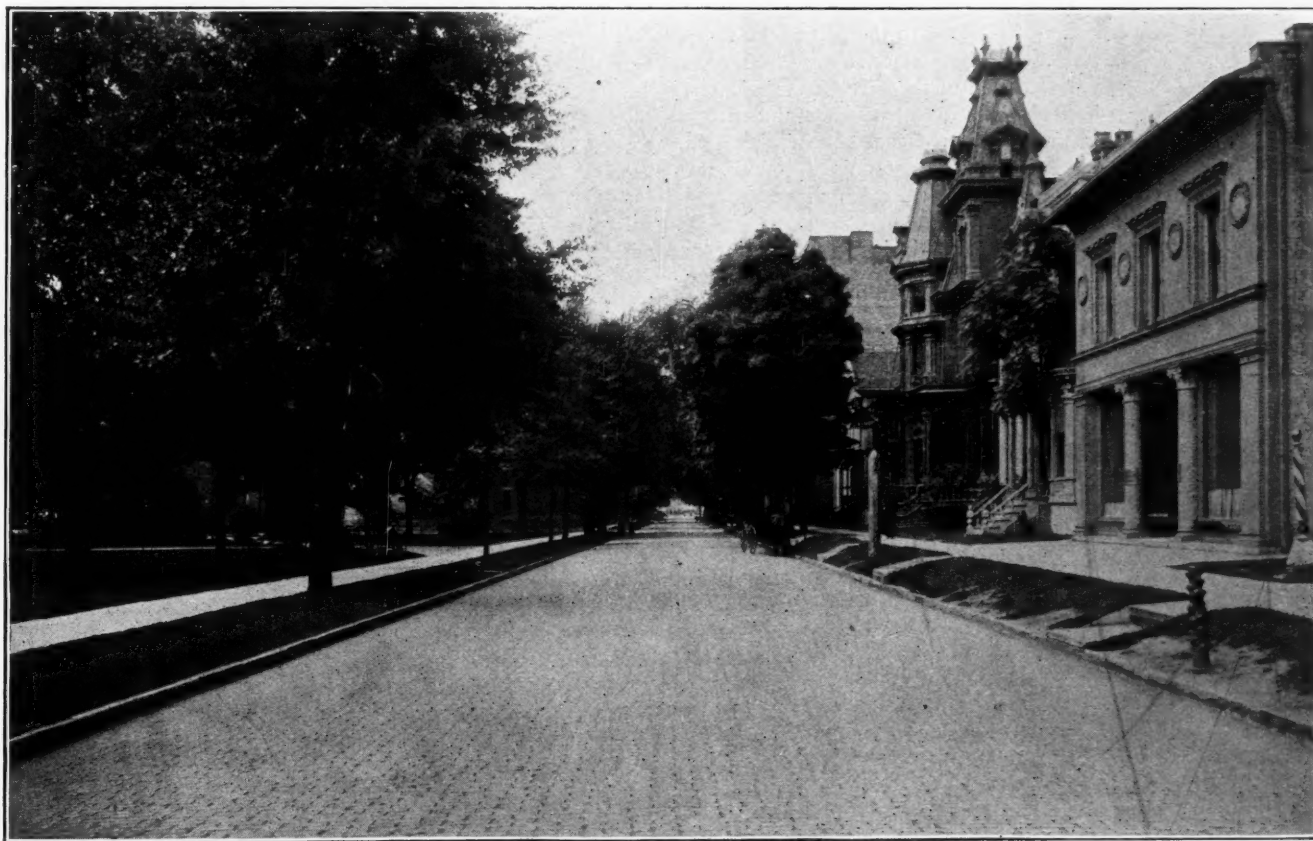
The Fire Department

This city is particularly well protected against fires. The department is one of the best in the country. It has a well organized and thoroughly equipped life-saving training school with two practice drill towers in constant operation. It has several fire boats, also. The appropriation for 1901 amounted to \$654,560, which, with the cash balance of \$52,056.94 on hand July 1, 1900, made a total of \$706,617 at the disposal of the department for last year, of which \$693,760 were disbursed for maintenance, improvements, etc. In-



the advisability and necessity of analyzing the air in schools and other public buildings, for the purpose of determining exact conditions. Detroit is the first city in the United States to undertake this important work. Although the work has been in progress only a short time, the results obtained thus far are very satisfactory. The knowledge of the conditions existing in the case of each particular building has enabled the authorities to correct some of the bad methods of ventilation. Another practice, which is not quite so much of an innovation, has been recently inaugurated and has given excellent satisfaction. The health officer has secured the assistance of

cluding the non-uniformed force, the department has a total of 500 men in its employ. The average fire department, if it has an appropriation equal to one thousand dollars to each member, is considered liberally supported. This department, as will be seen by the appropriation, is much better supported. The equipment of the department is valued, including engine houses, at \$1,808,880.99. It has twenty-four engine companies, ten ladder companies, one chemical company, one water-tower company and six supply companies. Among the engines owned by Detroit are the Manning, Amoskeag, LaFrance, Ahrens, American, Clapp and Jones, and Silsby, which

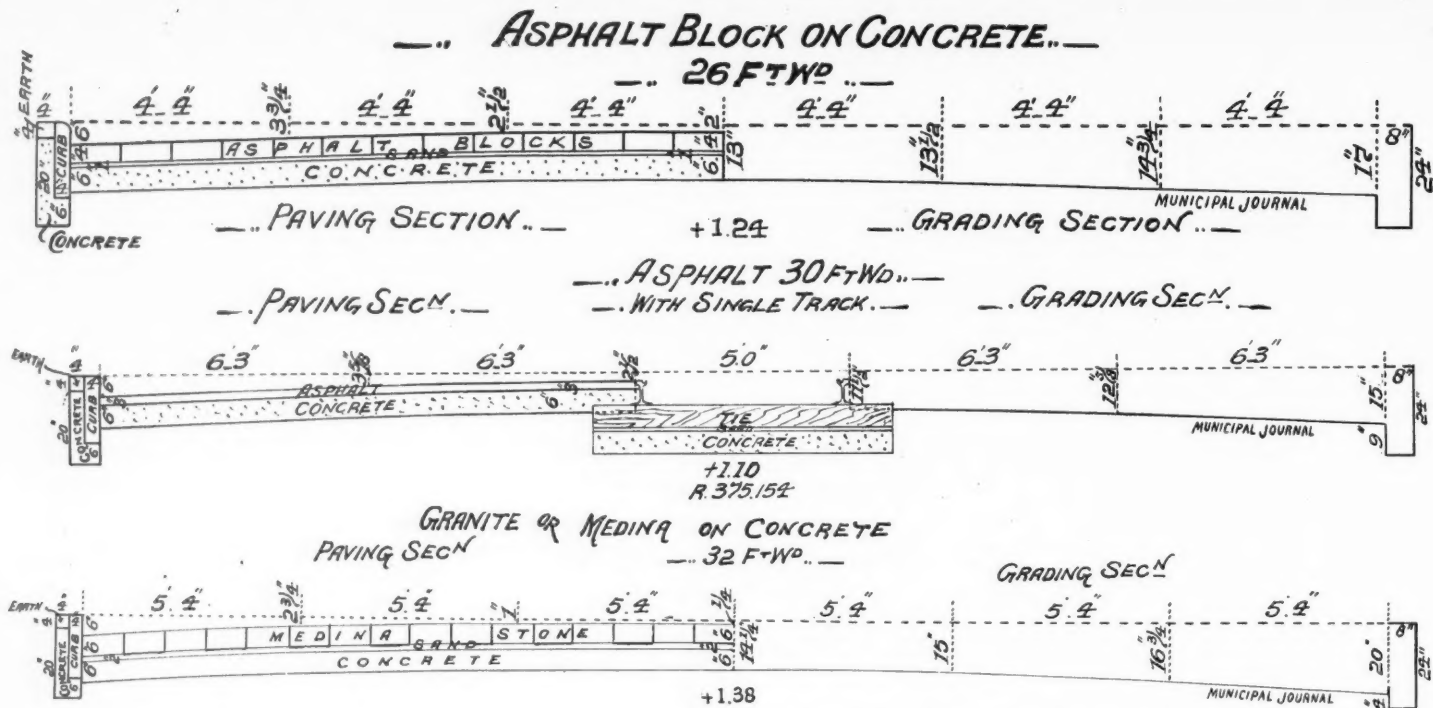


BRICK PAVEMENT ON ADAMS AVENUE

a number of bright, energetic physicians who have consented to act as health inspectors for certain schools, without pay. It is their duty, when notified by the principal of any school that certain pupils are ailing, to visit the school in question and examine the pupil in order to determine the presence of any contagious or infectious disease. In this manner the health of the public school children is protected. This same work has been carried on in other cities with great effect, but at the expense of the Health Department. There is no good reason why the physicians of Detroit should be required to perform this labor for nothing.

includes the leading manufacturers of fire engines. The only hose used in this department is that manufactured by the Eureka Fire Hose Company. The Vajen-Bader smoke helmets are exclusively used. Several companies are equipped with the Hunter life net, and the chemical engine is of the Babcock type. The water tower was furnished by the Fire Extinguisher Manufacturing Company of Chicago.

There were 984 fires for the fiscal year closing June 30, 1901, as compared with 1,083 for the previous year. The total loss last year by fire amounted to \$586,693. The department has about 73,000 feet



of cotton rubber lined hose, ranging from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches, and nearly five thousand feet of one-inch chemical rubber hose.

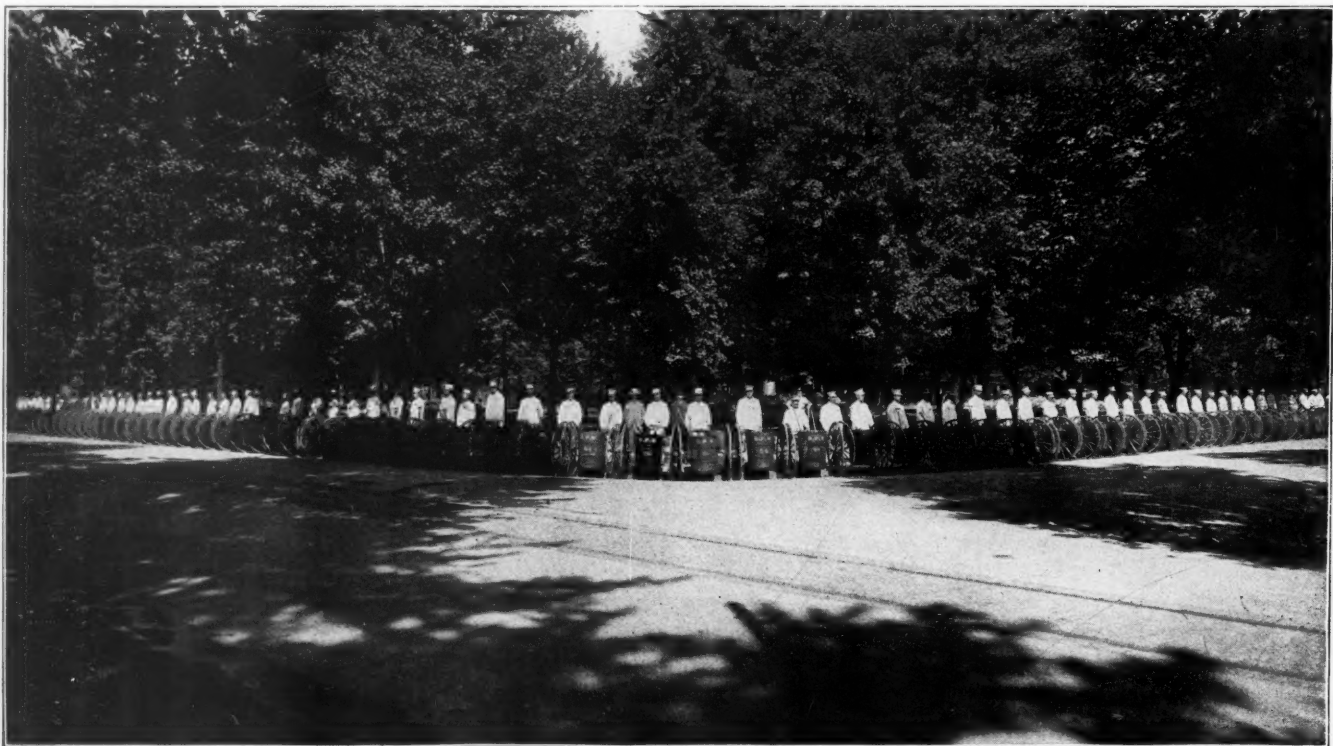
Chief Kendall, under former regulations of the department, was obliged to devote a large amount of his time to the petty details, including the keeping of accounts. Not long since, however, he was released from this by a special provision of the Fire Commissioners, so that at the present time he is devoting all of his time and energy to the maintenance of discipline and that excellence of administration which can only be secured by strict surveillance on the part of the chief. In this respect Detroit may be looked upon as one of the model departments of the country.

One of the features of the department in which the commissioners and chief take special pride is the fire alarm telegraph system. As might be expected, this was installed years ago by the Gamewell Company of New York, and has been kept up to date by repeated

improvements. There are now in service 436 signal boxes, public and private. There is maintained, in connection with this, a telephone system, comprising sixty-four telephones, for which 140 miles of aerial wires and 27,190 feet of standard underground cables are employed. The department has constructed and maintains its own underground system for wires, which includes 78,270 feet of cable, 130,351 feet of single wire, 30,400 feet of wooden conduit, 120,519 feet of iron pipe conduit, 202 brick manholes, 14 wooden manholes and 73 box posts.

THE DRILL TOWERS

In the organization and equipment of its life-saving corps the department secured its ideas from New York, as most cities having this feature have done, but instead of having one, the department has two practice towers. These have not been constructed precisely like the one used in New York, but were invented by Battalion Chief



THE "WHITE WING" BRIGADE—SEVENTY-EIGHT STRONG



A "WHITE WING" AT WORK

ladder and on the south a leaning ladder. The other equipment of the tower comprises a knotted rope and a life line, which, when in use, are fastened to the roof.

This tower is designed to keep the firemen in good physical condition and "knocks the rough edges off" new recruits. They are required to run up the stairway to the top, and gradually their nerve and wind are improved until they can take a run across the vacant lot adjoining the ladder house and continue the run until they reach the top. When they are taught to scale the sides with pompier ladders, slide on the life line from the roof to the ground, go up and

FIRE DEPARTMENT STATISTICS

	No. of regulars.	Alarms.	Fires.	Property loss.	Cost of maintenance.
Cleveland, O.	413	1,492	1,357	\$944,753	\$455,739
Buffalo, N. Y.	472	1,030	922	1,023,659	658,541
San Francisco, Cal.	442	863	845	486,964	591,767
Cincinnati, O.	327	1,094	1,051	678,405	493,330
Pittsburg, Pa.	406	1,192	1,180	1,361,102	501,554
New Orleans, La.	290	502	444	477,775	255,000
Detroit, Mich.	413	1,190	1,083	598,364	489,260
Milwaukee, Wis.	337	1,247	1,073	245,597	395,985
Washington, D. C.	217	639	565	224,239	231,178
Newark, N. J.	206	697	657	867,934	286,187
Jersey City, N. J.	188	656	550	163,009	225,712
Louisville, Ky.	207	778	751	501,495	256,342
Minneapolis, Minn.	291	1,002	979	612,194	323,319

down ropes hand over hand and to do many other things until they can go anywhere about a building and become absolutely fearless. It is also important that they should be strong enough to support the weight of others, and the drill received on this instruction tower is better than practice in a gymnasium.

Public exhibitions are given on this tower, forty men giving full dress rehearsals with water, fire engine and hose wagon, to show how such a number of men can climb about a building at the same time. Chief Harris has working plans for the construction of this tower and can furnish them to any department desiring to erect a similar tower.

THE FIRE BOATS

Another portion of the fire service of Detroit is its fire boats, of which it has two—the *Detroit* and the *James Battle*. These boats are staunch and strongly built craft, beamy and of unusual large displacement for boats of their dimensions. The *Detroit* will be familiar to our readers, as we reproduced a photograph of that boat, together with its description, in our August issue of last year. This boat has been in commission nine years, while the other is only about a year old. Each boat has a crew of twelve men, including the captain and lieutenants and two engineers, two pilots, two stokers and five pipe men. The sleeping quarters of the men are in the houses on the shore to which the boats are moored. These houses are models for convenience and equipment, being provided with excellent dormitories, bath rooms, lockers, etc. The duties of the fire boat companies are similar to those of the ordinary fire company.

William H. Harris. The tower stands on a solid stone foundation and is 63 feet high. Including the lower story it is equal in height to an ordinary six-story building. It is built of heavy timbers and is 13 feet square, none of the sides being inclosed. On the north side of the structure is a stairway, in the center of a perpendicular

POLICE STATISTICS

	Police- men.	Licensed saloons. No.	Amount for drunk- ness.	Arrests for drunk- ness.	Total arrests.	Cost of main- tenance.
Cleveland, O.	359	1,868	\$350	9,437	19,923	\$400,791
Buffalo, N. Y.	702	1,706	500	12,222	28,347	780,790
San Francisco, Cal.	586	3,173	84	13,732	26,448	884,461
Cincinnati, O.	512	1,703	350	2,154	13,291	599,659
Pittsburg, Pa.	436	526	1,100	5,460	22,085	515,560
New Orleans, La.	295	1,544	*	5,292	17,839	229,000
Detroit, Mich.	470	994	500	2,152	7,443	535,405
Milwaukee, Wis.	314	1,734	200	1,717	4,794	324,228
Washington, D. C.	571	496	400	4,188	25,943	653,723
Newark, N. J.	362	1,320	250	1,767	7,232	416,422
Jersey City, N. J.	358	985	250	3,967	7,676	425,329
Louisville, Ky.	339	856	150	1,382	8,049	279,426
Minneapolis, Minn.	212	329	1,000	1,707	4,308	212,001

* Not including 29 park policemen.

* From \$100 to \$1,500, according to amount of sales of preceding year.

The headquarters of these fire boat houses are equipped with telephones, registers, etc., the same as the ordinary engine house, and the alarm system is conducted on the same principle. The *Detroit* responds to alarms on the east side of the city front, while the *Battle* responds to alarms on the west side. Each boat carries five thousand feet of hose. The boats make from eight to fifteen runs a month.

A unique feature in connection with the pipe line part of the fire boat system, is the telephone service, by means of which communication can be had from any plug on the line with the fire boats at the river. A small telephone apparatus is carried on each tug and it can be readily adjusted to any plug in the system. This arrangement is of incalculable value. Through its operation the crews of the fire boats can be advised as to the progress of a fire at any point within their districts, so that the water pressure can be increased or diminished, as the case may require. If it were not for this telephone system much valuable time would be lost by sending mes-

PUBLIC PARKS AND SCHOOLS

	Parks.	Schools.
	Acres.	No. teachers.
Cleveland, O.	1,438.19	67
Buffalo, N. Y.	1,025.50	88
San Francisco, Cal.	1,197.50	94
Cincinnati, O.	539.00	53
Pittsburg, Pa.	900.00	82
New Orleans, La.	552.66	71
Detroit, Mich.	1,199.00	70
Milwaukee, Wis.	486.94	50
Washington, D. C. ....	.98	129
Newark, N. J.	19.16	52
Jersey City, N. J.	22.20	29
Louisville, Ky.	1,350.00	51
Minneapolis, Minn.	1,581.01	59

sengers to the scene of the fire to give and receive information. The boats are provided with dynamos, and they are thus able to supply their own electricity. As a matter of course, the boats are equipped with the Eastman pipe holders. The general utility of the fire boats has never been questioned by the citizens since they were entered

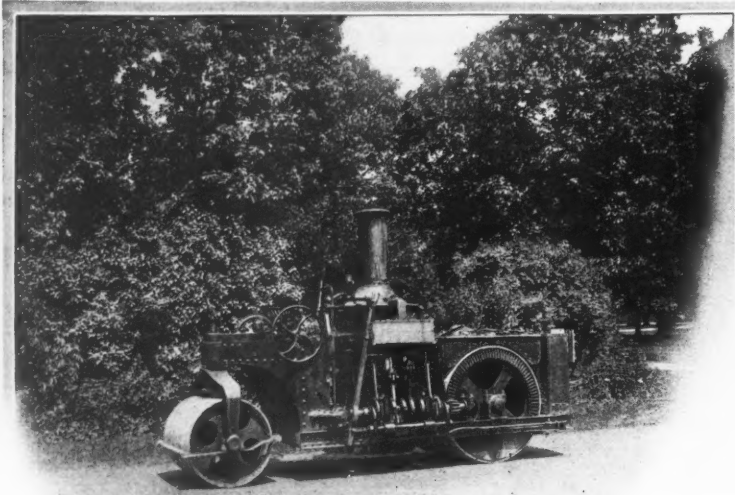


ADMINISTRATION BUILDING OF THE HEALTH DEPARTMENT

into commission. This part of the service is equal to the best in the country, including New York, Boston and Chicago.

The Police Department

The Police Department is one of the three commissions which was effected by the recent "ripper" legislation. Mr. Frank C. Andrews, involved in the recent financial failure which astounded the citizens of Detroit, was appointed Police Commissioner in place of the three-man board. Within a few hours after his recent failure, he sent in



ROAD ROLLER USED IN "GOOD ROADS" DEPARTMENT

his resignation, which was immediately accepted by Mayor Maybury, who appointed in his place Mr. George W. Fowle, formerly president of the three-man board.

Mr. Fowle has assumed his duties and the affairs of the department are moving along more prosperously than ever. He took occasion to make, when he accepted the responsibility, in a short speech to the superintendent and various captains of outlying precincts, some forcible remarks. Among other things, he instructed the officers to at once open a crusade against all classes of criminals. Particular stress was laid upon the necessity for watching out for criminals on all incoming trains. Special means were to be taken to apprehend all suspicious characters, and unless they could give a

satisfactory explanation of their presence in Detroit, they were to be given a limited time to shake the snow of Detroit off their feet in order to avoid serious consequences.

Like the Fire Department, the Police Department is liberally maintained. It has 403 patrolmen and a total force of 518. The Gamewell system of police telegraph, in combination with the telephone system, is one of the indispensable equipments of the department. The detective squad is one of the most effective in the country. Greater vigilance is necessary by the Police Department of Detroit because of its location on the Canadian border line. It has a well equipped and effective Bertillon system for the detection and identification of criminals. Chief Downing has had long years of experience in police work and makes one of the most efficient executive heads that the force has had for many years. He is well known in national police circles and has a recognized ability of great value.

There is a movement on foot to establish a Juvenile Court. A wiser step in connection with the prevention and suppression of crime could not be taken. More attention than ever is being paid nowadays to the treatment of the criminal classes and an effort is being made to prevent the making of criminals out of boys and adults who are guilty of the first offense. In establishing such a court Detroit will only be following the good examples set by New York, Chicago, Philadelphia, St. Louis, Rochester and several other cities. The practice of mixing youthful offenders with hardened criminals is now recognized as exceedingly bad.

The Parks and Boulevards

There are other systems of parks in the United States which are larger, more pretentious, and which possess more picturesque features, but there is none better, when all things are considered, than that of Detroit. Its larger park, Belle Isle, has a national reputation. Its one defect, if it can be said to have any, is that for which nature is to blame—its topography, which is a dead level. In comparing the park acreage of a group of thirteen cities, Detroit stands fourth in the list, having 1,199 acres. Nearly \$100,000 were expended for maintenance of the park and boulevard system for the fiscal year ending 1900.

This commission was also affected by the "ripper" legislation last winter. It is one of the boards, however, the affairs of which had been managed satisfactorily to all concerned. This change was due to one of the fortunes, or misfortunes, of politics. Mr. P. H. A. Balsley, the president of the old commission, is to be credited for many of the admirable features now found in the park and boulevard system. Although a busy man himself, and serving on this commis-



THE BARNs ON BELLE ISLE PARK

DEBT AND SINKING FUND

	Debt.		Sinking fund.	Net debt.	Legal borrowing limit, per cent.
	Bonded.	Floating.			
Cleveland, O.	\$15,766,530	\$1,164,338	\$2,607,596	\$14,323,272	† 7
Buffalo, N. Y.	16,051,800	907,194	1,205,412	15,753,582	† 10
San Francisco, Cal.	250,000	537,011	208,169	578,842	§ 10
Cincinnati, O.	31,557,450		5,579,894	25,977,556	§ 10
Pittsburg, Pa.	23,830,702	1,215,938	5,446,071	19,600,569	† 7
New Orleans, La.	14,132,530	517,295		14,649,825	† 7
Detroit, Mich.	6,828,363	34,882	1,965,280	4,897,965	† 2
Milwaukee, Wis.	5,900,250	* 676,336		6,576,586	a 5
Washington, D. C.	15,091,300		537,426	14,553,874	b 5
Newark, N. J.	16,474,000	1,999,000	4,295,359	14,177,641	§ 10
Jersey City, N. J.	18,290,154	1,440,133	3,028,934	16,701,353	§ 10
Louisville, Ky.	9,656,000	218,369	2,119,298	7,755,071	† 10
Minneapolis, Minn.	8,550,000	358,115	1,872,115	7,036,000	† 5

* Including \$626,336 secured by park property. † Of assessed valuation. ‡ Assessed value of real estate. § Controlled by vote of people. ¶ No limit. a Of average assessed value for five years. b Controlled by Congress.

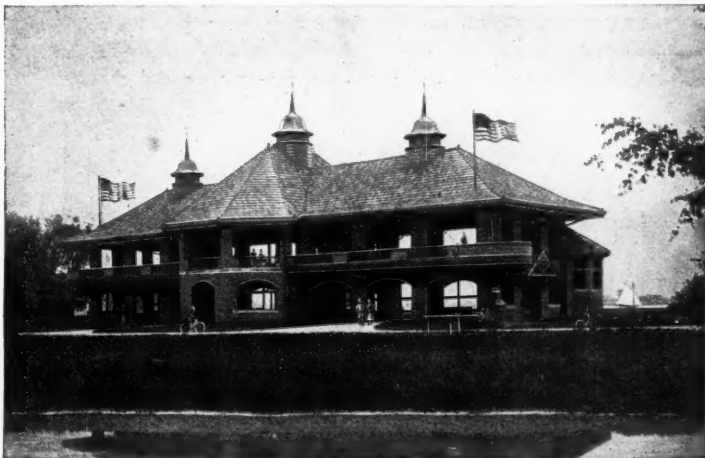
sion without salary, he devoted a large amount of his time to the development of the system. As a matter of fact his enthusiasm led him to devote more time to the work than business principles would have allowed. His loss was Detroit's gain.

The present commissioner, Mr. R. E. Bolger, has been connected with the system of parks for a number of years, and, therefore, the city will not suffer by the change. Mr. Bolger was thoroughly conversant with the plans of the former commissioners and practically in harmony with them, so that the "ripper" legislation will be robbed of its evil effects.

The Park Department has its own engineering division, owns its own horses, barns, vehicles and all necessary apparatus for the construction and maintenance of its drives, walks and other features. Band concerts are given every summer, playgrounds are maintained for children and there is an annual day set aside, known as Children's Day, which has become exceedingly popular. During the past season thousands of children enjoyed the privileges of the playgrounds and more than 25,000 people were entertained at the park concerts.

THE AQUARIUM

There is now being erected on Belle Isle Park a combined aquarium and horticultural building covering a space of about 300 by 350 feet; the center dome of the horticultural building is 80 feet high for



SHELTER PAVILION IN BELLE ISLE PARK

palms, at either side of which is a large palm house and at one end is located a fernery; at the other an orchid house; in the rear is a large house for exhibiting plants when in blossom. This structure is principally of steel and glass. When completed there will be on exhibition both fresh and salt water fish and animals. The building and equipment will cost in the neighborhood of \$150,000. This will add very much to the attractions which are to be found on Belle Isle.

The commission is endeavoring to make every dollar of the appropriation go as far as it will. In harmony with this purpose it has established its own nursery, from which will be supplied within a short time, all the trees and shrubs required for use in the embellishment of the park. It has been found that they can be grown at a much less price under the care of the Park Commission than they can be purchased from commercial nurseries. This permits of a very material advantage which is gained in transplanting the stock the

same day it is removed from the nursery rows. In this manner many dangers of loss which arise from the purchase of stock from distant nurseries are avoided.

In the winter, skating rinks are maintained on the artificial lakes of Belle Isle. These are patronized by thousands of children and adults. The rinks are kept in good condition at the expense of the Park Board.

The roadways and walks are constructed and kept in excellent repair by the employees of the department, under the direction of the superintendent. During the



ICE WATER DRINKING FOUNTAIN

past season 1,400 square yards of roads were constructed at an approximate cost of 75 cents per square yard; 8,766 square yards of roads were resurfaced at 18 cents per square yard; 1,555 square yards of walks were constructed at 50 cents per square yard, and 25,424 square yards of walks were resurfaced at 2 cents per square yard. As compared with other park systems in the United States, the engineering department is economically maintained. There are some cities, however, which lay Macadam pavements at a much lower rate than is common in this department. For instance, one of the finest pieces of Macadam road ever laid cost the city of Springfield, Mass., last season, 43 cents per square yard. It is possible that the increase in cost of Macadam roads laid in Detroit's park system may be accounted for by local conditions.

Considered as a whole, it is impossible to do justice to the excellent system of parks and boulevards constructed and maintained by the city of Detroit. Instead of two or three hundred words, it would need several thousand to give anything like the impression which the visitor obtains from a most casual observation of the park system itself. In conclusion, it may be said that the reports which are issued by the Park Commission exceed in manner of composition, typography and illustration, anything of the kind published in this country.

The Municipal Lighting Plant

The lighting plant of Detroit is one of the heir-looms of the Pingree administration. It has been one of the most talked of municipal plants in the country. The opponents of municipal ownership always refer to it as a failure, while the friends of public ownership point to it with pride, as a success. Without going into the merits of the case, and with no intention of discussing the matter from the standpoint of an expert, it may be pertinent, as well as interesting, to state a few facts about the plant. Facts are stubborn things; they sometimes cut both ways like a two-edged sword.

On the one hand, no one attempts to dispute the fact that politics do, to a greater or less degree, enter into the administration of this department. As a consequence, the expense of maintenance is increased. There is no doubt that the cost per arc light to the city of Detroit is greater because of the baneful influence of politics in the administration of affairs of this municipal plant.

PROPERTY VALUATION AND TAX RATE

	Assessed valuation of property.		Tax rate per \$1,000.			
	Real.	Personal.	State.	County.	City.	Total.
Cleveland, O.	\$109,242,770	\$40,526,650	\$2.90	\$3.90	\$13.00	\$30.00
Buffalo, N. Y.	223,078,010	* 22,795,577	†	4.49	18.21	16.96
San Francisco, Cal.	280,530,645	121,624,659	6.01	†	10.20	23.48
Cincinnati, O.	164,311,260	42,170,530	2.90	4.20	14.05	25.98
Pittsburg, Pa.	347,988,437	4,594,355		2.00	15.00	¶ 17.00
New Orleans, La.	106,743,609	40,006,500	7.00		22.00	29.00
Detroit, Mich.	174,165,440	70,206,110	1.84	1.05	9.32	18.29
Milwaukee, Wis.	127,084,780	30,190,093	2.49	3.13	14.32	23.14
Washington, D. C.	176,567,549	13,193,707				
Newark, N. J.	118,389,585	31,716,875	†	6.78	15.62	22.40
Jersey City, N. J.	84,552,605	8,772,395	2.58	5.52	20.10	28.20
Louisville, Ky.	80,200,000	31,800,000	4.75	1.50	13.10	22.65
Minneapolis, Minn.	78,668,250	20,823,804	1.60	3.17	14.90	27.40

* Including franchises. † Included in county. ‡ Included in city. ¶ Not including ward school tax of \$0.14 to \$7 and state tax on securities, mortgages, etc. § City, \$15; agricultural, \$10.

Legal basis of assessment is 100 per cent. of full value on real and personal, except on real in Pittsburg, where it is 100 in the city, 66-2-3 in suburban districts and 33-1-2 in the agricultural districts. This applies also to basis in practice. In practice the basis is 100, except in Cleveland, where it is 50; Buffalo and Detroit, 70; San Francisco, Cincinnati, Milwaukee, Louisville, Minneapolis, 60.



DOWNTOWN POST

On the other hand, if this plant were owned and operated by a private company, its valuations would be placed to-day at a figure three or four times that which is placed upon it by the city authorities. While under private ownership the plant might be conducted in a more economical way, it cannot be claimed that the citizens of Detroit would receive a cheaper light, a better light or a better service. As a matter of fact, less light would be given and fewer privileges would be granted to the citizens than are now obtained under municipal ownership. THE MUNICIPAL JOURNAL AND ENGINEER endeavors to look at the situation in an unbiased way, and it claims that, in considering the value of the arguments on both sides, it is justified in concluding that not only in the case of Detroit, but in nearly every

instance, the people are justified in operating their own electric light systems, on the ground that they receive more for their money than under private ownership. There are exceptions, of course, but they only tend to prove the rule.

From the sixth annual report of the Public Lighting Commission, we learn that the property owned and controlled by the city includes a power house, an office building, seven double deck tubular boilers of the C. C. Peck design. Each boiler has 3,000 square feet of heating surface and is equipped with the Hawley down draft furnace, Hoppes live steam purifier and a Worthington water meter.

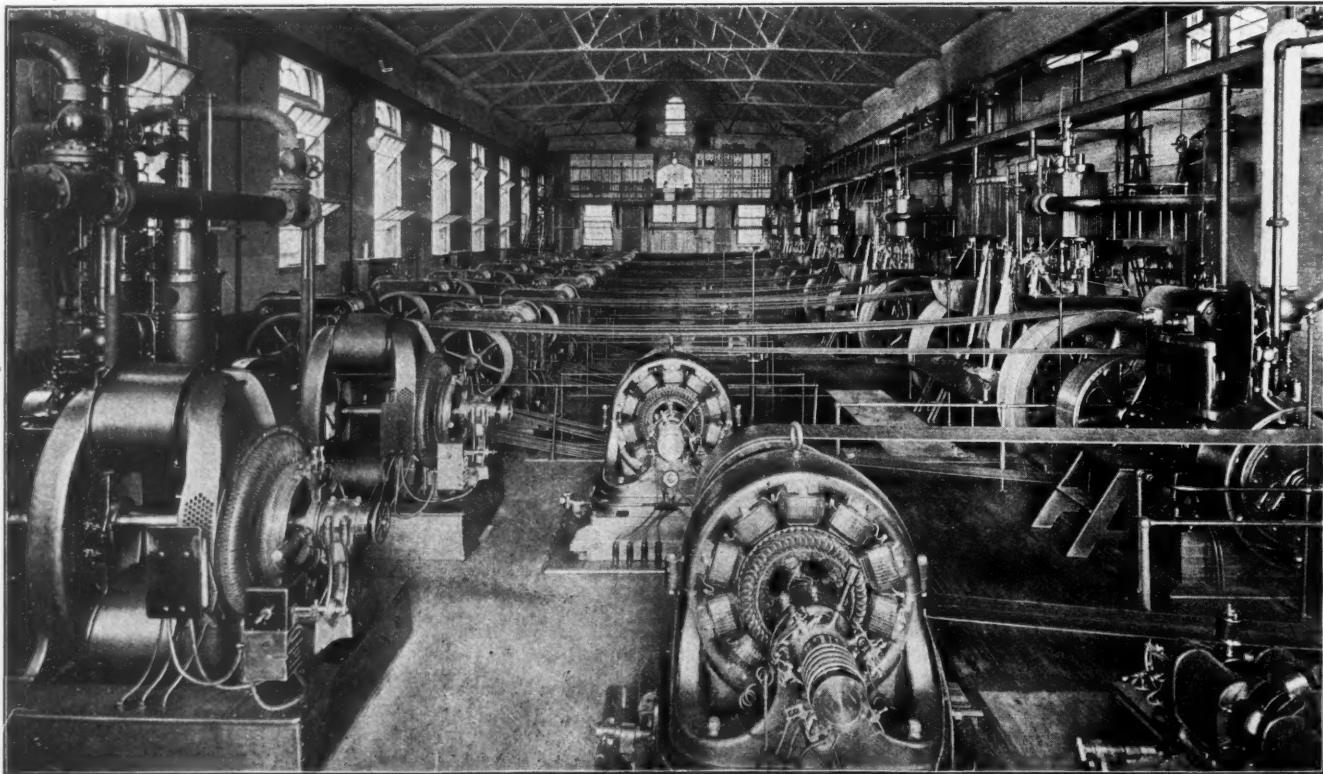
Five of these boilers are used at one time to operate the plant, the other two being kept in reserve. A change is made every six weeks and each boiler, as it is put out of commission, is given a complete overhauling and cleaning. The coal is handled in one ton charging

cars on a "Hunt" industrial railway. The coal bins adjoin the firing floor and have a capacity of eight hundred tons. A switch has been provided connecting with the railway, which makes it possible to run the cars of coal along side the power station and unload directly into the coal bins.

The pump room contains one fire pump and one thousand gallons per minute capacity, which is connected to a complete system of fire mains and is always under steam. It is used during the day to feed the boilers and to operate a water motor which runs the machine shop. A Worthington feed pump, two jet condensers, a Wainwright heater and one Westinghouse air compressor are also located in the pump room. In the arc lighting division in the engine room are located five triple expansion marine type engines, twenty 50-kilowatt, 4-pole Western Electric Company arc dynamos for constant current, three 57½-kilowatt, 2-pole constant current by the same company, one 7-kilowatt, 2-pole brush arc dynamos. For the incandescent service there are three compound Westinghouse engines, three 55-kilowatt, 2-phase Westinghouse alternators, two exciters, one triple expansion marine type engine, one 175-kilowatt Stanley 2-phase alternator, one 40-kilowatt Northern Electric 125-volt direct current dynamo.

This plant furnishes light for 2,055 arc lamps, mostly of the open arc type. The total output of the plant for the year in kilowatt hours was as follows: For arc lighting, 3,475,389; for incandescent lighting, 497,961, making a total of 3,973,350.

In determining the actual cost of an arc light per year to the city, the commission allows for depreciation, on the entire investment of \$744,187.17, three per cent., which, to June 30, 1901, amounted to \$22,325.61. The interest on the net investment up to July 1, 1900—\$720,620.34—for one year at four per cent., amounts to \$28,824.81. The taxes which the city loses because the property is not operated by a private corporation are figured by charging to the operation of the plant at the regular rate of taxation for the city, county and state. The probable assessed value, based upon a comparison with the assessed value of similar plants, is placed at \$351,885. The rate of taxation is \$18.07 per thousand dollars, and the tax on the assessed valuation would amount to \$6,358.56. The cash cost of operating the plant amounts to \$99,094.62, making the total cost, including depreciation, interest, lost taxes and operating expenses, \$156,603.60. The gross cost per arc light for the fiscal year ending June 1, 1901, is figured at \$67.31 for an all night and every night service. This is a slight increase over the previous year, which is due to the increase



GENERATOR ROOM OF LIGHT PLANT

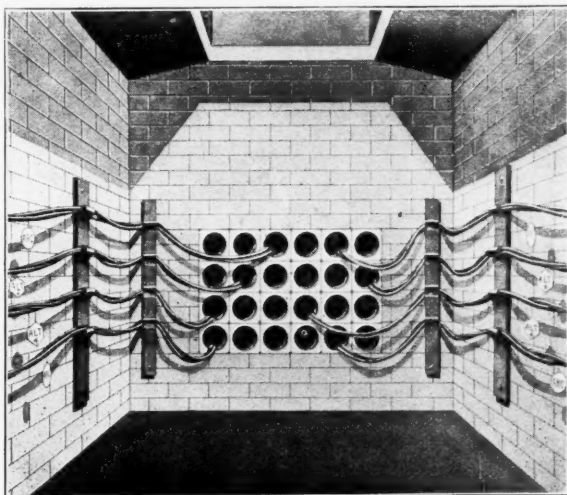
in the price of fuel. President David W. Simons of the commission, said, in concluding his last report:

"Public lighting may be deemed no longer an experiment in the city of Detroit. demonstrated. But its success has been while the experience of the last six years leads to the conclusion that municipal lighting can be done efficiently and at a saving to the taxpayers, it has also demonstrated that such results can be obtained only by the most rigid and careful economy, the application of the highest order of business method, and a complete alienation of those influences which often hamper and harass the operations of public boards.

"It must be remembered that the work of this commission in one important respect differs from that of other public boards. This commission is not alone performing certain public functions as are other departments of the city government, but it is manufacturing a commodity which has a definite and measurable market value and quality, and which can be readily compared with that produced by private companies. It therefore behooves this commission to be continually alert lest its efficiency and independence of conduct be hindered by circumstances to which private manufacturers are not a prey. That the commission has for the most part been free from such influence its success is indicative, but a word of warning is always opportune and may keep us from lulling ourselves into too great a feeling of security. So long as we apply the same business principles as have been in the main applied in the past, so long will municipal lighting be successful and demonstrate the wisdom of the taxpayers who established it."

The Water Works System

For many years the Water Works Department of Detroit has been looked upon as a model. Its affairs are managed by a board of five water commissioners. It may be said in this connection that a one-



MANHOLE OF CONDUIT

DEBT, VALUATION AND EXPENDITURES PER CAPITA

	Net debt.	Assessed valuation, real and personal property.	Police.	Fire.	Schools.	Total.
Cleveland, O.	\$37.52	\$392.30	\$1.28	\$1.19	\$2.87	\$12.14
Buffalo, N. Y.	44.71	697.74	2.28	1.87	3.24	16.96
San Francisco, Cal. ...	1.69	1,196.55	2.93	1.72	3.66	17.47
Cincinnati, O.	79.71	633.57	2.18	1.51	3.22	18.62
Pittsburg, Pa.	57.83	1,096.28	1.60	1.56	2.67	19.86
New Orleans, La.	51.03	514.62	.99	.89	1.49	14.25
Detroit, Mich.	17.14	855.33	1.91	1.71	2.81	11.73
Milwaukee, Wis.	23.05	554.39	1.20	1.39	2.58	12.21
Washington, D. C. ...	52.22	680.84	1.49	.83	3.91	18.00
Newark, N. J.	57.62	610.02	1.69	1.16	3.62	19.80
Jersey City, N. J.	80.90	452.08	2.11	1.09	2.28	20.75
Louisville, Ky.	37.88	591.02	1.89	1.25	2.51	13.98
Minneapolis, Minn. ...	34.71	490.79	1.12	1.59	3.63	14.22

* Including United States Government expenditures for water works, but not for lighting of public parks and spaces.

man commission would probably do better work than is performed by the five members of the present commission. The department is thoroughly organized, including the executive, engineering and construction, distributing system, accounting, etc. For the twelve months ending June 30, 1901, \$245,251.26 were expended for construction, \$176,416.26 for operation and maintenance, \$91,435.95 on interest account, \$200,000 on bonded indebtedness, and smaller sums for minor matters, making an aggregate expenditure for the year of \$728,680.29. The estimated valuation of the plant, including real estate, buildings, distributing system, etc., to date, is \$6,220,832.79.

There is no reservoir in connection with the system. Its pressure is direct and the supply is taken from the Detroit River. Its quality is comparatively good. The bacteriological division of the Health Department keeps close tab on the supply, so that any impurities are quickly noticed. There is but one pumping station. This, with the installation of two additional engines now installing, will give a total daily capacity of 152,000,000 gallons. The new engines are of the Allis-Chalmers make.

The total number of gallons pumped during the past fiscal year amounted to 17,677,470,000. Of this amount 13,253,847,349 gallons were unmetered, and 3,823,253,128 gallons were metered. The average daily consumption was 46,786,576 gallons. The daily per capita consumption was 153 gallons. The revenue per thousand gallons on metered water amounted to 2.4 cents, on unmetered water 1.6 cents. The cost of delivering one thousand gallons of water during the same period amounted to about 1.3 cents. In reckoning the cost of delivering a thousand gallons every expense is included excepting that for permanent construction work or improvements. These figures indicate that the water costs the city too much money. It should be produced for one cent per thousand gallons less in a city the size of Detroit.

On July 1, 1901, there were only 5,635 meters in use out of a total of 57,234 service taps. Here is where the department makes a mistake in not rapidly installing a larger number of meters each year. On a liberal estimate, the city uses twice as much water as it should use. It would be an economical move on the part of the management to make it a practice of installing at least four thousand new meters a year. This would be sure to work in the interest of the



ONE OF THE SIX LIGHT TOWERS

department and the consumers. The system has 570 miles of mains in use and 3,332 fire hydrants. As has been previously stated, there is no doubt that the administration of the department's affairs could be conducted to a greater advantage by a one-man commission.

The water system of Detroit, as compared with other cities, however, is about on a par with the average city of its size. As compared with Buffalo, it is placed in a more favorable light, for the latter city used last year 310 gallons per capita per day, making it the most wasteful city in regard to the use of water in the world. The experience of Buffalo should serve as a warning to Detroit. At the present time the average daily consumption in Detroit is creeping up slowly, but surely, and it would seem from present indications that the average daily consumption of Detroit would equal or exceed that of Buffalo by the time it has reached the population of the larger city. The Detroit plant, however, has this distinction, that it delivers water to

Unfortunately for the city, politics have gained an unusual control over the management of its educational affairs, and for this reason the standing of its system of education will not compare favorably with cities of its size. As a matter of fact, it does not begin to be as good as that which obtains in the little city of Springfield, Mass.

This department, of all others, should be kept clear of politics. Every citizen who has the right of franchise has a direct interest in this matter and should make it his especial business to see that the evil is removed. It may be said, however, in conclusion, that when the affairs of the various departments of the city government are measured for what they are worth, and compared with those of other cities of its size, it may be said to be about on a level with the best. Where Detroit is weak in one point another city is strong, and where it is strong in another point the other city is weak; so that, taken for all in all, there is no just

reason for taking a pessimistic view of the general conduct of the affairs of the city. The optimist has greater reason for encouragement than even the average citizen of Detroit believes. Judging from a wide observation, and comparing similar conditions in numerous cities of the Middle West, South and East, it is safe to prophesy that if the theoretical and often impractical reformer would seek to become acquainted with the average politician and city official, he would see less to condemn and more to commend. More than this, if the reformer would treat the city official more as a fellow citizen and spend more of his energy in chanting the beauty of the good that is to be found in the city, greater progress would be assured.



CRANE FIXTURE

the small consumer who uses but one faucet, at a lower price than any other city in the world—\$3.60 per year.

Conclusion

It is impossible to even mention the merits of many of the administrative departments of the city in so brief an article as this. An investigation of the Treasurer's department revealed that the funds of the city were safe-guarded, that a reasonable per cent. of interest was paid on daily balances, and its various affairs conducted in a faithful manner. The City Auditor's department is all that could be

desired. The City Clerk's office, as in other cities, is the principal bureau which would naturally be consulted by the average citizen or stranger in quest of general information about the conduct of the city's affairs. The present incumbent has several unique methods for discharging the city's business in operation which space will not permit us to describe. The fireproof vaults in this, as in nearly all other departments in the City Hall, are wholly inadequate to the demands



DOUBLE LAMP POST ON BOULEVARD

upon them, so that many valuable records are unprotected from the ravages of fire. This is a penny wise and pound foolish policy which should not be continued.

The garbage or refuse of the city is systematically collected and disposed of in a sanitary manner under the contract system.



POST—BELLE ISLE PARK



DOUBLE POST IN UNDERGROUND DISTRICT

MEETING OF OHIO CITY OFFICIALS

Fifth Annual Meeting of the State League—Dayton's Electrolysis Case—The Revised Code Bill Considered—The Merits of Bituminous Macadam Presented—Municipal Taxation and Other Topics Discussed

By Our Special Correspondent

THE fifth annual session of the League of Ohio Municipalities was held at Columbus February 4 to 6 inclusive. The topics discussed were the most interesting ever brought before this active organization. The paper on Electrolysis of Water and Gas Pipes Resulting from Electrical Currents Escaping from Street Railways, by E. P. Matthews, Esq., City Solicitor of Dayton, O., was a most valuable production, for the reason that it dealt with facts as drawn forth during the recent trial and argument in that city. The case was under the direction of Mr. Matthews and, therefore, the points were clearly and authoritatively presented. The paper is given in full elsewhere in this issue.

The Hon. Tom L. Johnson, Mayor of Cleveland, gave his views on municipal taxation, showing the injustice that is done the small taxpayer. He cited many instances to substantiate his statement which had been revealed by his investigation in Cleveland. Mr. Johnson's remarks were listened to with rapt attention and received with unanimous approval.

THE REVISED CODE BILL

Hon. Aaron A. Ferris, of Cincinnati, analyzed the Pugh-Kibler Municipal Code Bill as revised by the State Bar Association. This revised bill, it was claimed by Mr. Ferris, omits the objectionable features which contributed to the defeat of the original bill two years ago. The present bill contains many excellent features, the adoption of which would do much toward bringing about a practical reform in the conduct of the affairs of Ohio municipalities. There is no state in the Union where a uniform municipal code is more urgently needed than in Ohio. The evils arising from special municipal legislation which have run riot for years in Ohio and played havoc with the rule of its municipalities, would be practically eliminated by the adoption of this revised code bill.

The new bill provides for the merit system of appointments and seeks to separate legislative and executive powers. The classification of cities, as provided by the new bill, although an improvement over the present method, is open to criticism. The Constitution of the state divides municipalities into two classes only—cities and villages—and the revisers of the bill undertake to adapt the classification to the Constitution. For this reason, arbitrary rules are laid down which are sure to cause dissatisfaction. The wiseacres think it would be better for the municipal code reformers to secure an amendment to the Constitution which would permit of a logical and reasonable classifications of the cities. It seems likely that this will have to be done before the question is settled.

One of the radical changes made in the municipal legislative body is found in the recommendation which limits the Council to seven members, four to be elected by the district, one from each district, and three to be chosen at large, one of whom is to be elected as president of the Council. All councilmen are to receive salaries and are to give bond. The term of service is limited to two years, the district councilmen and those at large being elected in alternate years. Every councilman is obliged to attend all meetings and answer to roll call at the beginning and close of each session, or suffer a deduction from his salary.

AUTHORITY OF EXECUTIVES INCREASED

The executive officers, including the mayor and heads of departments, are given larger authority than under the present code. The executive power in cities will be vested in the mayor and the department of accounts, law, public safety and public improvements. The most stringent provisions are made for the punishment of officers who receive any pay, reward or emolument other than the salary which is to be fixed by ordinance. No officer shall attend or be a member of any political convention while holding office. The mayor and heads of the several departments are entitled to seats in the council, to take part in its proceedings and deliberations on all ques-

tions relating to their respective departments without the right to vote. In case of misconduct in office, incompetency, gross neglect of duty, gross immorality or habitual drunkenness of any mayor, the governor of the state is given the right of removal.

The provisions in reference to water works require that cities shall not purchase existing plants or grant franchises to private companies, or own and operate a water works system except upon the ratification by the vote of the people at a general municipal election, and provides that where a system of water works is owned and operated by the city, it shall be under the management of the Director of Public Improvements, and in villages of the Superintendent of Water Works.

PROVISIONS FOR STREET RAILWAY FRANCHISES

In granting franchises for street railroads, the directors of law and of public safety, the mayor, president of Council, and one other member of Council chosen for that purpose, are constituted a commission to draft an ordinance containing conditions upon which it is proposed to make the grant. This draft then goes before the Council for consideration. If adopted, then advertising for bids in accordance with the terms of the ordinance begins. When the bids have been received and tabulated, then two questions are submitted to the voters at the next general municipal election, first as to whether the franchise shall be granted; and, second, which bid shall be accepted.

The subject of assessments as related to public improvements has been radically changed in two principal respects, viz., the abolition of the foot front and valuation rule, and the retention of the benefit rule, under the decision of the Supreme Court of the United States in the case of *Norwood vs. Baker*. The other novelty introduced in the revision is the requirement that the assessment shall be submitted to the Probate Court, which is required to hear all questions relating to the amount thereof, with power in the Court finally to determine the amount of benefits, increase or diminish the same, equalize the same as to all lands assessed, or make a new valuation or assessment, as the justice of the case may require, and thereupon the judgment of the Court shall be made the basis of the assessment ordinance to be passed by the Council. The foot front rule, however, is retained in assessments made for street sprinkling only.

Under the head of finances and taxation the bill arbitrarily provides that all cities will be permitted to levy taxes for municipal purposes exclusive of the tax for school and schoolhouse purposes not exceeding an amount of sixteen mills, while villages are limited to eight mills. This provision is likely to cause trouble if adopted, because it cannot be easily adapted to cities of varying population. As in the case mentioned above, this defect would be remedied by an amendment to the Constitution.

H. H. McMahon, Esq., of Columbus, discussed the municipal question in Ohio, rather taking issue with the promoters of the revised code bill recently introduced in the Ohio legislature. Mr. McMahon presented a clear, logical argument for home rule and made some telling points against the bill referred to. In concluding he said:

"It is believed that home rule is the first great step towards municipal reform; that it will call into exercise the best ability and highest character in the various municipalities and make good municipal government not only possible but probable. It is believed that such a measure complies strictly with the constitutional requirements and would be valid. And last of all, it is urged that such a home rule system of municipal government would be in perfect harmony with the spirit of our free institutions."

The third session was devoted to the discussion of a paper, which dealt with the sewer question as related to cities of from 6,000 to 15,000 inhabitants, by W. D. Brumbaugh, City Engineer of Greenville, O. Following this the Hon. J. W. Vandervort, Mayor of Park-

ersburg, W. Va., ably discussed "the perils and possibilities of modern municipalities."

VALUABLE PAPER ON BITUMINOUS MACADAM

"The advantages of state municipal leagues" were clearly set forth by Mr. Allen Ripley Foote, editor of *Public Policy*, Chicago, at the fourth session. Following this the editor of the *MUNICIPAL JOURNAL AND ENGINEER*, discussed the subject, "The Bill Board Nuisance; Should It Be Regulated?" Jason Blackford, Esq., of Findlay, O., called attention to "some irregularities in municipal legislation." Mr. Arthur Bradley, of Cleveland, O., an asphalt expert, then read a valuable paper upon bituminous macadam. This is a new pavement of which a large number of square yards have been laid during the past season in New England and other cities. Mr. Bradley called attention to the opinion of Prof. A. W. Dow, the government expert on asphalt pavements in Washington, who, when he saw a piece of this pavement laid at Charlestown, S. C., recently, said: "Basing my opinion on what I have seen of this pavement, it exceeds in good qualities any pavement I have ever seen laid." Mr. N. B. Abbott, a resident of Columbus, in the discussion which followed the reading of this paper, spoke highly of the merits of bituminous macadam. As Mr. Abbott has been actively connected with asphalt paving work for the past thirty years, his words had considerable weight. He was in the bituminous paving business twenty years before the Barber Company started, and the two oldest pieces of asphalt pavement now in existence were laid by him. Col. W. L. Dickinson, for fourteen years Superintendent of Streets of Springfield, Mass., and the "father of good roads" in Massachusetts, happened to be a visitor and was introduced to the convention by President Lindemuth. He said that he had taken particular pains to investigate bituminous macadam as it had been laid in several New England cities during the past season, and as one who had a general interest in different pavements, wished to commend in the highest terms the quality of the pavement about which they had just heard. There was only one point, in his estimation, which had not yet been fully reckoned with and that was the element of time. He felt convinced, however, that bituminous macadam was the coming pavement.

"The best methods of municipal taxation" was the subject of a paper by Mr. Lawson Purdy, of New York City, following which the

Hon. Samuel M. Jones, Mayor of Toledo, gave an address on "What Is Crime and Who Are the Criminals?" At the close of this, the fifth session, the officers for the ensuing year were chosen. Hon. Clement W. Linkhart, Mayor of Xenia, was elected president; Hon. L. G. Silbaugh, of Lancaster, vice-president; Hon. J. L. Orbison, ex-Mayor of Carthage, was re-elected treasurer; Dr. S. O. Giffin, of Columbus, was re-elected secretary. The trustees chosen were W. D. Able of Chillicothe, E. L. Boynton of Niles, and E. B. Schmidt of Bellaire. Hamilton was selected as the meeting place for the next convention.

ENTERTAINMENT AND ELECTION OF OFFICERS

The reception and entertainment of the guests by the city of Columbus was of a most cordial nature. Elaborate plans were made and carried out by which the visitors were taken to the various points of interest about the city. The members of the local committee, Messrs. Frank Rathmel (chairman), W. C. Cussins (treasurer), J. F. Jones, J. J. Engler, J. T. Lindsay, L. G. Byrne, C. C. Philbrick and S. C. Bradford, succeeded in their efforts to give the delegates a good time and make them feel at home. A special committee was appointed to look after visiting newspaper men, of which many found their way to the capital on account of the Legislature being in session. Mr. John T. Barr, City Clerk, acted as chairman of the Press Committee, and was assisted by the following newspaper men: Charles F. Kipp of *The Citizen*, Herbert E. Kreitzer of *The Dispatch*, Mr. Copeland of *The State Journal*, Mr. L. A. Parrish of *The Press*, and Mr. George Gordon of *Der Westbote*. A special banquet was given to visiting newspaper men on the first evening of the session.

For the first time in the history of this organization its proceedings will be published. The Columbus city officials are to be given the credit for this innovation, as they took it upon themselves to guarantee the expense incident to such publication. It was one of the most successful and profitable conventions the League has ever held. The retiring president, Mayor J. R. Lindemuth, of Dayton, has contributed very largely to the success of this League during the past two years, and the secretary, Dr. S. O. Giffin, of Columbus, was presented the sum of \$50 showing the League's appreciation of his untiring efforts in its behalf.

AMERICAN IDEAS IN LONDON

THE people of London are greatly interested in New York's plans for relieving the congested condition of her streets and solving the transportation problem. London has a problem more difficult of solution and is endeavoring to bring American ideas to its service in order to relieve the congestion of traffic at Cheapside, The Strand, Piccadilly and Tottenham Court Road. Sir John Wolfe Barry is quoted as saying that this condition in London costs the community about \$10,000,000 annually. As a matter of fact it is impossible to estimate accurately the total cost throughout London of the delays and losses to business through present conditions.

Mr. Charles T. Yerkes' recent success in securing the installation of Westinghouse apparatus for the great generating plant of the Metropolitan and District Railways, has encouraged the advocates of a cleaner city to look to America and American engineers for relief. The *London Daily Mail* of recent date contains an elaborate review of the entire subject, concluding as follows:

"The Council is seriously considering the question of electric underground tramways on the American model, to relieve the congestion of the traffic in the heart of London. Here distances are indeed short, but progression all but impossible. Tubes and tramways, by bringing in vast crowds from the suburbs and outlying districts, increase the congestion at the centre, and add to the difficulty of transit in the city itself. In Boston the cars run down an inclined plane, about a hundred yards in length, to a shallow covered passage, traverse the congested district, and re-emerge into the visible world where there is more room for them. Short, well-lighted stairways render the passage accessible from the street, and an inducement to ride, however short the distance. The subway can also be used for the pipes of the various companies, who at present, by their everlasting tearing up of the streets, make the life of the Londoner a burden.

"The various schemes which we have barely touched upon point to an enormous necessary increase in the supply of electrical power, and the question that presents itself is how this supply is to be procured. If each and every enterprise sets up its special electrical plant and proceeds to generate its own power, there will necessarily be a considerable amount of overlapping and waste.

"If, according to the scheme elaborated by Mr. George Westinghouse, a large central supply station is founded, with which the various companies can contract for the supply of as much energy as they require, the capital expenditure of each company will be reduced by about one-half. Further, he proposes to reduce the cost of generating electricity 50 per cent. by the adoption of gas instead of coal engines. The most economical steam engine in the market consumes two pounds of coal to produce the electrical unit technically known as one horse-power-hour. Turn the coal into gas, and one pound of coal instead of two will produce the same result. But this is understating the case, for the majority of engines require five to ten pounds of coal to produce the unit. The same process would utilize garbage and refuse which London produces in appalling quantities by converting them into pure gas of great commercial value. Mr. Westinghouse's system proposes the establishment of a central gas supply, with pipes for its transmission to factories, where it may be used for the production of power.

"This scheme means not only a saving of one-half the material now required for the production of electricity—it also means the reduction by exactly one-half of the total volume of our London smoke. A vision rises in the mind of a clean, bright London, with an atmosphere to which Paris has nothing "à reprocher," where fogs have become more or less a matter of history, and streets have ceased to be impassable. The times are fraught with change—the vision is, perhaps, not altogether Utopian."

ELECTROLYTIC DAMAGE TO WATER AND GAS MAINS

The Famous Dayton Case—The Stray Current from the Street Railway Does the Damage—Experts on Both Sides Admit Its Origin—Remedies Proposed—Many Other Cities Affected

By Edwin P. Matthews *

ELECTROLYSIS of water pipes is not a matter of general information outside of scientific circles; it is a contraction of the words "electric," "analysis." It means the decomposition of a metal by chemical action set up by a current of electricity flowing from the metal in the presence of an electrolyte, *i. e.*, that where a metal is surrounded by a bath of some kind and the electricity passes from it into this bath, chemical action is set up which takes metal away from the mass to which it belongs and carries it to some other point. In the case of pipes buried in the earth the moisture in the soil surrounding the pipes constitutes this bath, or electrolyte. Electrolysis may be seen in any electro-plating establishment. In such places a vessel containing an acid solution has placed in it a bar of silver, for instance, and some article which is to be silver plated. The electricity is passed in through the silver, which is at the positive pole, through the solution to the article which is to be plated and which is at the negative pole, and out again. In this process the silver is taken from the positive pole and deposited upon the article to be plated at the negative pole, and if the current continues to flow long enough, the silver will entirely disappear from the positive pole and will be found deposited at the negative pole.

In the earth the metal taken from the pipes by the current of electricity flowing from them is found deposited in the ground, and upon the stones, which are often well electro-plated.

BEGINS WITH INTRODUCTION OF SINGLE TROLLEY RAILWAY

Electrolysis of water pipes was never heard nor thought of until after the advent of the single trolley electric railroad.

In the use of electricity there must be a circuit, and the electricity which goes out from a dynamo must return. The unit of measure of the quantity of electricity is called the ampere, and every ampere, or fraction thereof, sent out from a dynamo or battery, must get back to its source. If there is no circuit the electricity cannot circulate, and no heat, power or light can be produced.

With the single trolley electric railroad the electricity is generated or circulated by the dynamo at the power house, and is sent out overhead on the trolley and feed wires, passes through the trolley pole on the top of the car, through the car on wires into the motor, through the motor to the axles of the wheels, and thence to the rails, which are intended to be the path to conduct it back to the power house. Some of it does go back this way, but some of it does not. The law of divided circuits is, that electricity will flow by all of the paths open to it, most of it going by the paths of least resistance. The path of least resistance in the case of a single trolley electric road is the rails, providing they are well bounded and have sufficient negative feeders connected to them and running to the power house. But no matter how well the track may be constructed and bonded, and no matter how perfect the system of negative return feeders may be, some of the returning electricity will leak or escape from the rails into the ground and get upon the buried pipes and follow them until some better conductor presents itself when the current will leave the pipes for this other conductor, and it is at the points of departure that the damage is done to the pipes. Such damage is caused by electrolysis, or electrolytic corrosion, as it is sometimes called.

HOW THE DAMAGE IS DONE

Electricity flowing upon the pipes does not necessarily leave them for the rails of the railroad tracks, but may go to other pipes or conductors and the damage will happen wherever the electricity leaves.

The amount of damage to a buried pipe from electrolysis is in direct proportion to the amount of the current flowing from it, and so long as the current flows, no matter how small, there must be some electrolysis.

The voltage or force of the current does not determine the amount of electrolysis and has nothing to do with it, except that there must be pressure or voltage enough to cause the current to flow, and this may be accomplished by a very small fraction of a volt.

It is found that the current of an electric railway usually escapes from the rails and goes upon the water pipes at points remote from the power house, and we speak of such territory as the "negative district," because there the pipes are negative to the rails.

The electricity commonly flows from the pipes back to the rails at points in the proximity of the power house, and such territory is called the "positive district," because the pipes are positive to the rails, and it is in the positive district that the greatest damage will be found. The positive district may extend over considerable territory and is not necessarily nor generally confined to a small area around the power house.

It has been usual to denominate the positive district as the danger district, but this is a misnomer, for all the pipes that carry currents of electricity from electric railways, whether in the positive or negative district, are in more or less danger.

All of the current which finds its way to the water pipes must find its way back from them ultimately to the rails and return feeders on its way to the power house.

The joints of the water pipes are not made with reference to the flow of electricity and are not electrically perfect. The resistance offered to the flow of current through them is higher than the resistance offered by the body of the pipe, and in the negative districts where the tendency of the current is to flow from the rails to the pipes and along them, when it reaches a joint of high resistance, which may be very common, it will shunt, or jump, around it through the earth, and will cause electrolysis on the positive side of the joint, and while this damage may not be so rapid, as that going on in the positive districts, it is nevertheless sure and must destroy the pipes.

THE RELATIVE DAMAGE TO DIFFERENT KINDS OF PIPES

In the positive districts the current leaves not only cast-iron mains for the tracks, but also leaves the service pipes which are usually of lead, and these give way much more rapidly than the iron mains.

One ampere of electricity flowing continuously from cast iron in the presence of an electrolyte, for one year, will carry away about twenty pounds of metal, and flowing for the same length of time from lead will carry away about seventy pounds of that metal.

The action of electricity is different upon cast iron, wrought iron and lead. When wrought iron and lead pipes are subjected to electrolysis, the lead pipe presents a honey-combed appearance where the holes have not gone clear through, and the wrought iron pipe presents a fibrous appearance, but both will be perforated and frequently in a short time. With cast iron pipes the metallic iron is carried away and there is left behind a kind of graphite which is soft and which can be easily cut with an ordinary penknife.

The extent of damage to cast iron pipe from electrolysis is not always obvious when the pipe is first uncovered. It may appear to be good, but upon examination it will be found to have soft places in it, which, in some instances, are so numerous and close together as to practically make the whole pipe soft. A pipe affected by electrolysis of course has not the strength of a sound one, and, under pressure, will often burst, or a soft place or plug may blow out.

In the negative districts where the current flows from the rails to

* City Solicitor of Dayton, O., who read this paper before the fifth annual meeting of the League of Ohio Municipalities, held at Columbus, February 4 to 6, 1902.

the pipes, electrolysis of the rails occurs and it is not uncommon to find the under side of the rails soft so that they may be cut or pierced with an ordinary penknife just as the pipes affected by electrolysis may be.

At first the railway companies stoutly denied the alleged origin of electrolysis, but I think that now the damage and its sources are universally admitted. In the Dayton case it was denied in the answer of the street railway company, but upon the witness stand it was admitted by every electrician who testified.

ORIGIN OF DAMAGE EASILY DETECTED

It is an easy matter to show that electricity found upon the pipes parallel with street railroad tracks comes from them.

It is a characteristic of street railway current that it is variable, this being caused by the distribution of the cars which use the current. If, in the negative district, an excavation is made alongside the railroad track laying near the pipes which are buried there, and the terminals of a volt-meter are attached to the pipes, say at a distance of ten feet apart, the movement of the needle upon the voltmeter will be found to correspond exactly with the movement of cars in the neighborhood. In case of such an experiment, if the current is flowing from east to west, when a car passes going east the current upon the pipe will be increased, as will be shown by the instrument. If the car stops to let off or take on passengers, after passing the excavation, the needle will descend the scale, and as soon as the motorman throws on his current to start the car, the needle will immediately rise, and from the influence of the sudden flux of current has waned as the car gets underway, the needle will descend the scale somewhat, and if there are curves in passing around which more current must be used than on the straight track, the needle will rise as the car goes around the curve.

Current which is in this way traced to the street railways must leave the pipes, and in doing so must, by law as unchangeable as the law of the Medes and Persians, do damage. If the flow is very small, the damage may be slow but the pipe will be destroyed by it just as surely as water dripping upon a stone will wear it away.

ONE WAY TO PREVENT ELECTROLYSIS

There is one sure way by which electrolysis may be prevented, and that is by the use of either the overhead or underground double trolley system, whereby both the outgoing and the returning currents are confined upon insulated metallic conductors. This, so far as I know, is the only absolute remedy.

There are three places in this country where the double trolley is used, viz., in Cincinnati, where it is the overhead system, and Washington and New York, where the underground system is used.

The subject of electrolysis was investigated by a committee of the United States Senate and a report was made, which resulted in Congress enacting laws whereby no single trolley lines are permitted in the District of Columbia.

There is no electrolysis in New York, and there is none now in either Washington or Cincinnati.

What was known as the Main street line in Cincinnati was once a single trolley road and during its existence as such, the pipes parallel with it for a distance of about twelve hundred feet on Main street were damaged by electrolysis, but such damage has not been found anywhere else in that city, and is not now taking place there.

The street railway companies are very reluctant to adopt the double trolley for various reasons, among which is the increased cost of installation. It seems to me, however, that by so doing they would save much in operation because it is easier to drive the current out and back over copper conductors than it is to drive it back through the rails, the earth, and all sorts of things of high resistance, and Mr. John Kilgour, who was for twenty years president of the Cincinnati Consolidated Street Railway Company, in his testimony in the Dayton case, gives the double trolley system his highest endorsement.

OTHER METHODS OF PREVENTION

A number of expedients, other than the double trolley system, to prevent electrolysis, have been suggested by the street railway people, the most extraordinary of which is that the water works companies and departments shall uncover their pipes and insert insulat-

ing joints, which, by the way, no one has ever used or attempted to use on water pipes, but which are used on natural gas pipes in Indianapolis, which are in a very bad condition as the result of electrolysis. I may say that the insulating joints on the Indianapolis pipes were not placed there to prevent electrolytic action, but for some other purpose.

The thing most strongly insisted upon by the street railway people is that the electricity should be drained from the pipes by cables running from them to the negative pole of the dynamo at the power house. Whether this does any good is questionable. It is still experimental and has not proven satisfactory. One effect of making these connections is to form a better path for the electricity from the pipes and thus to invite a larger flow along them, and there must be increased damage at the joints, and it is not probable that such drainage cables will pick up all of the current upon the pipes, but that some of it will still go from the pipes into the earth and back to the rails.

In the Dayton case all electricians, including those who represented the street railroad company, agreed that if drainage is applied to the water works system, all underground systems of pipes should be connected together, because otherwise, electricity flowing upon the gas pipes, for instance, will be attracted to the water pipes through the earth and damage will occur to the gas pipes; or, if the drainage system is applied to the gas pipes alone, the situation will be reversed.

If the drainage system is permitted, the pipes thus connected would form part of the return circuit of the street railway company, and there is no obligation upon the part of the city or of companies owning underground piping systems, to furnish part of the equipment for the operation of electric street railways.

MANY CITIES SUFFER FROM ELECTROLYSIS

In a number of places, among which is Patterson, N. J., connections between the water pipes and the power houses were made some years ago, but the owners of the pipes became convinced that damage resulted as a consequence of these connections, and they were taken off.

Better bonding of the tracks and an ample supply of return feeders will undoubtedly do good, but these improvements cannot entirely prevent electrolysis. In Boston, in the last three or four years, about three hundred tons of copper were used by the street railway company for negative return feeders and cables in an effort to prevent its current from leaking into the earth, but still there is serious damage occurring to the water pipes in Boston from electrolysis.

I believe that wherever a single trolley electric railroad is in operation, electrolysis, to a greater or less degree, will be found upon examination, and that any community which fails to take up this matter will at some time have a rude awakening by the bursting of its water mains when water is most needed.

We learned a great deal during this trial and my knowledge of the subject has been gained from that case. We have electrolysis in Dayton, but no worse, I am convinced, than a good many other places and not nearly so bad as some, as the city of Brooklyn, for instance, in regard to which testimony was produced.

The city of Dayton owns its own water plant. When the damage being done to it was discovered and the cause ascertained, the city officials concluded not to wait until the water plant was rendered useless or disabled, but to take immediate steps to do what lay in their power to protect this public property. I cannot take the time to review this case for the evidence is very voluminous. That in Dayton there is electrolysis of water pipes and that this was caused by the currents of the street railways was testified to and admitted by every electrician called to the stand on either side.

Our water system is not utterly destroyed, nor nearly so, but serious damage has taken place and we think that the danger to the plant is real.

During the progress of the trial, one night, under fire pressure, a six-inch main, which had been damaged by electrolysis, burst. That piece of pipe was brought into court and is known as "Exhibit 33."

Our case is now in the hands of the court and I do not think it is proper for me at this time to enter into a discussion of the law involved, and governing ours and similar cases; but I can say that Mr. O. M. Gottschall, who was associated with me in the trial, and myself feel well satisfied with the showing made by our side.

ONE BILLION DOLLARS FOR MUNICIPAL IMPROVEMENT

New York to Spend \$24,000,000 in General Improvements—Chicago, Philadelphia, Boston, St. Louis and Baltimore to Expend Proportionate Amounts—New Water Works and Electric Light Plants by the Score Contemplated—Greatest Activity Ever Known in Municipal Field

THE second year of the new century promises the most lavish expenditures for municipal improvements of all kinds. Pavements and good roads will take the lead, with water works, sewer systems and electric light plants closely following. As might be expected, the city of New York will be the most prodigal in its expenditure for general improvements, including pavements, water works, sewers, bridges, subways, boulevards, parks and the like, for a total of \$24,000,000 will be expended. The subway work is fully six months ahead of schedule time, and unless something unforeseen happens it will be completed and ready for operation one year sooner than was anticipated when the contract was signed. Changes in the original plans of the Croton Dam and the Jerome Park Reservoir, made necessary by serious errors, will involve additional expenditures of hundreds of thousands of dollars.

BRIDGES BUILDING IN PITTSBURG

Among the smaller cities of the country, Pittsburg is to expend the largest amount for bridges for the coming year. No less than six bridges—foot, railroad and highway—will be constructed within the city limits during the coming year, at an aggregate cost of more than half a million of dollars. An accompanying illustration gives a good view of the "Fern Hollow" bridge, which was completed last fall. The total length of this bridge is 450 feet, the width of the roadway 36 feet between curbs, and the total width of the bridge being 50 feet from center to center of railings. It carries two lines of street car tracks. The roadway is paved with asphalt on Portland cement foundation on top of buckle plates, and the sidewalks are paved with Portland cement on top of buckle plates. The greatest height from the bottom of the valley is about 100 feet. The total cost of the bridge was \$86,000, which includes the cost of masonry, steel work, railings and paving. Pittsburg has under way one of the largest filtration plants in the country, being second only, of its kind, to that now under construction in Philadelphia. It is of the sand filtration type.

The work on the filtration plant in Philadelphia is progressing as rapidly as could be expected. From present indications the total expenditures for the enlargement of the water system and the construction of the filtration plant will aggregate \$20,000,000 before it is completed.

ST. PAUL'S LARGE SCHEMES

St. Paul, Minn., is planning for a large amount of work the coming season. City Engineer Clausen writes: "We shall do a great deal more work in all lines of construction than we have done in previous years, except perhaps in the matter of bridges. We are pretty well supplied with bridges as we have sixty in the city and there is no new work contemplated in that line, except the extension of one bridge to replace a wooden trestle bridge. It will be an iron trestle bridge about 900 feet long. The only thing that I could see which would be of interest to the MUNICIPAL JOURNAL AND ENGINEER readers would be the construction of new market sheds. These sheds are all of steel construction and open. All of our work will be done by contract except in connection with the maintenance of bridges, streets and sewers, which is done by day labor. I send you a photograph showing our ornamental electric light posts, which are placed on the corners and which were lately introduced. They are all located on the underground district. We shall do at least 100,000 square yards of paving, most of which will probably be asphalt. The balance will be brick and Kettle River sandstone. We have not laid any wooden block pavements for a number of years, although we feel favorably inclined towards the creosoted wood block pavement lately introduced into Eastern cities. We laid eight miles of sewers last year and will probably lay fully as much or more this year."

The city of Louisville has had an interesting but satisfactory experience in providing a system for the purification of its water. Its experimental search for a method of purifying the Ohio river water,

its source of supply, was long since completed satisfactorily, as also was the construction of the reservoir for the storage of clear water. The filter and coagulant houses, which form a part of the extensive mechanical plant now under construction, are nearly completed. The filters which have been contracted for are in process of construction also. The work will not be completed until July 1, 1904.

A new pavement has come into the field during the past year and a half which is known as bituminous macadam. Something like 100,000 square yards were laid in New England and Eastern cities last season. We have received information from city engineers, boards of public works and others in the East, West, North and South that contemplate laying some of this pavement during the coming season. A recent contract was awarded to a Cleveland concern for laying three miles of this pavement on the State Road leading out of the city. The interest awakened by this new supplant for public favor in the way of paving material, is so widespread that we are sure that our readers will be interested in the specifications according to which some of this pavement will be laid in Huntington,



TWO OF ST. PAUL'S NEW LAMP POSTS

Ind., during the coming season. These specifications have been kindly furnished us by City Engineer Guthrie of that city, and are as follows:

BITUMINOUS MACADAM SPECIFICATIONS

1. The roadway shall be graded to a true and smooth surface and the sub-grade to the depth of eight inches below the finished surface of the street, as shown on the plans and by the profile and stakes to be set by the City Civil Engineer. All soft and spongy places not affording a firm foundation shall be dug out and refilled with broken stone or gravel. The entire road-bed shall be thoroughly compacted by rolling with a heavy roller. Such portions of the road-bed as cannot be rolled shall be thoroughly compacted with heavy rammers.



ONE OF PITTSBURG'S NEW BRIDGES

Special care shall be taken at trenches to determine the condition of the filling, and the City Civil Engineer may require them to be dug out and refilled with gravel or stone if he considers it necessary.

2. On the top of this sub-grade shall be laid a layer of broken stone which shall not measure more than three inches in any direction and which shall be screened with revolving screens to free it from dust, loam or dirt. This stone shall be raked to an even surface six inches in depth after the same has been compacted thoroughly by a heavy roller, weighing not less than ten tons, and the surface to be left solid and parallel to the proposed finished surface of the street.

3. On top of this six-inch foundation of broken stone shall be spread by pouring a heavy coating of Warren's No. 24 "Puritan Brand" of hard heavy macadam bituminous cement heated to fluidity, to the amount of at least one gallon to each square yard of surface. The purpose being to firmly bind the foundation together and make it readily unite with the wearing surface. After the coating of bituminous cement has been put on, the surface shall again be rolled with a heavy roller.

4. Upon the foundation so prepared, shall be laid a wearing surface or pavement proper, which shall be two inches in thickness and com-

posed of carefully selected hard limestone, ranging in size from one inch in diameter to an impalpable powder mixed with sand, and containing all sizes and grades, including a one-inch, one-half inch size, and so on down to an impalpable powder, so that the mineral aggregate shall contain the least possible amount of voids. The stone and sand shall be heated in suitable appliances, to not higher than three hundred degrees Fahrenheit. It shall then be thoroughly mixed by machinery, with Warren's "Puritan Brand," No. 10, "Bituminous Macadam Composition," which shall be heated to not to exceed two hundred and twenty-five degrees Fahrenheit, using a sufficient quantity of said composition to not only thoroughly coat the particles, but to fill all voids in the mineral aggregate. The amount of said composition to be used shall be approximately nine per cent. to sixteen per cent. by weight. The exact proportion of materials will depend upon the character, location, grade and traffic of the street.

5. This surface coat mixed as aforesaid, shall be brought to the street in carts at the proper temperature; it shall then be carefully spread by means of hot iron rakes, in such a manner as to give a uniform and regular grade, and to such depth, that after having received its ultimate compression, it will have a thickness of two inches. The surface shall be compressed by a steam roller weighing not less than two hundred pounds per lineal inch of roller, the rolling being continued as long as it makes an impression on the surface. Before the final rolling shall take place, a slight coating of sand, grit or limestone screenings shall be sprinkled on the pavement and thoroughly rolled into the surfaces as to present a gritty surface. On side hills, and where ordered by the engineer, there may be rolled into the surface, a thin layer of coarse sand or stone chips for the purpose of presenting a rougher surface.

6. The bituminous composition or cement shall, in each case, be free from water, petroleum oil, gas or process tars, and shall be especially refined with a view to removing the light oil, naphthalene and other crystalline matter susceptible to atmospheric influence.

7. The pavement thus laid shall provide a wearing surface impervious to water or other liquids.

8. The contractor will be required, without additional compensation, to make good any damage to the work or any defect in the workmanship, materials or condition of the work, which may have occurred in a guaranteed period of five years. The same conditions to govern as set forth for brick pavement.

ADVANTAGES OF METERS

THE great abundance of everything has engendered in the people of the United States a disregard of all care in the use of things, and this is no more evident than in the way an enormous amount of water is wasted. It is a fact that foreign cities use from one-half to two-thirds less water per capita than American cities, and this difference is in most part due to the water that is absolutely wasted. Were meters installed, this enormous waste would be shut off and the people would have still an abundance of water for their needs, but there would be none wasted. In Geneva, N. Y., there are 609 consumers using water at the flat rate and 966 using meters. The former consumed 150,000,000 gallons during the year for which they paid \$7,781.25, or at the rate of \$.0516 per thousand gallons. The latter used 79,000,000 gallons for which was paid \$9,212.50, or \$.115 per thousand gallons. Had the flat rate consumers been using water at the rate of the metered but 25,000,000 gallons would have been used, or a saving of 54,000,000 gallons in the year. Owing to the introduction of meters in Oberlin, O., there was a reduction of 7 per cent. in the amount of water wasted and 22 per cent. in the amount of coal burned. The meter system has been rapidly extended in Atlantic City, N. J., and its success has been demonstrated. There is no guessing at the amount of the water consumed by a consumer and no possible system of inspection could accomplish what the meters do in preventing waste. In Cincinnati, O., it is the custom to place meters where it is clear that water is being used and wasted without adequate return of revenue. In many instances the revenue has been doubled and in all cases the waste has been diminished while an ample supply has been furnished at all times. In answer to the objection that metering water reduces the amount consumed and is

thus apt to affect the health of the community, it may be said that in Detroit, Mich., the increase in the use of unmetered water between 1898 and 1899 was over 12 per cent., while the increased use of metered water for the same period was 22 per cent. It has been found by actual measurement that the use of meters has reduced the daily average consumption over one-half, but, as is seen from the foregoing, the restriction has not prevented consumers from receiving all the water necessary for their needs.

It is objected in addition to the restricted use of water that the use of meters entails a large expense on the city for their maintenance. In answer to this it may be stated that the city of Harrisburg, Pa., spends but 1 per cent. of the annual expense of the water works for the repairs of its meters, while the saving in waste of water more than meets this extra expenditure. In Madison, Wis., the consumption of coal in the water works during 1885 amounted to 605 tons of coal per consumer; in 1900 with a meter system the amount per consumer was only 522 tons. This saving has been enough to pay for the installation and care of the meters, to say nothing of the amount of water saved that would otherwise have been wasted. In many places there is a limit to the supply of water no matter how much the pumping facilities are enlarged and water famines are ever imminent. Wherever meters have been introduced the per capita consumption of water is from one-fourth to one-half that in unmetered places. It is a fallacy to imagine that water can be supplied as freely as air or is as abundant. By guarding against waste by the use of meters, the reduction in the cost of pumpage will more than make up for the expense of the system. The cost of the care of meters is small and is less expensive than enlarged pumping stations,

THE LARGEST INTERCEPTING SEWER IN THE WORLD

Now Building in Chicago—Four and a Quarter Miles Long—More than 30,000,000 and 100,000 Barrels of Cement to be Used in Its Construction

By Our Special Correspondent

An intercepting sewer system is now building in Chicago which, when completed, will rival the famous trunk sewer of Paris. This system will divert all sewage now emptying directly into Lake Michigan and discharge it into the branches of the Chicago river, from which it will flow into the drainage canal. The system extends for a distance of twenty miles along the water front, of which four miles originally discharged into the river, leaving sixteen from which the sewage is to be diverted. Six miles of this water front is on the North side of the city and ten miles is located on the South side.

LOCATED IN DENSELY POPULATED DISTRICT

In this small but densely populated district new sewers have been building since 1898, by means of which the sewage has been diverted from the lake to the river.

One of the main conduits now building is sixteen feet inside diameter and 14,026 feet long. The work on this sewer was commenced under former Commissioner of Public Works L. E. McGann, but is now under the supervision of his successor, Mr. E. W. Blocki, with Mr. W. S. MacHarg as consulting engineer. More than twenty millions of brick and forty thousand barrels of Utica cement will have been used when this main conduit is completed. The vertical diameter of the conduit is below the Lake level, with a fall in the conduit from the Lake to the North front of the river of 2.8 feet. In constructing the Eastern portion from the Lake to Beacon street, a distance of 3,906 feet, there was an average open cut of twenty-nine

feet. The contract price allowed for this work was \$36.20 per foot. From Beacon street to Washtenaw avenue, a distance of 9,040 feet, the conduit will be built in tunnel form, the greatest depth being forty-one feet, which, it is estimated, will cost \$70 per foot. From this point for a distance of 1,080 feet, there will be an average open cut of twenty-eight feet deep and will probably cost about \$50 per foot.

The pumping station will be built at the river and will be equipped with centrifugal or screw pumps capable of discharging 35,000 cubic feet of Lake water and sewage per minute into the north branch of the river. The Lake water will be admitted at the Eastern end, at an intake built about three hundred feet into the Lake and the relative flow of sewage, storm water and Lake water will be regulated by a gate at this intake. The intercepting sewer which will take care of the sewage drained from the South district, will be twenty feet in diameter, inside measurement, and 12,120 feet long. When completed it will be the largest sewer in the world. A good idea of its size is given by the accompanying illustration. The Eastern end of this large sewer was built in an open cut at an average depth of thirty-eight feet. This portion was changed in form from the twenty-foot circle to a horseshoe section, 22½ feet wide by 18½ feet high, inside measurement. In this portion the arch is of brick masonry, while the side walls and dished bottom are of concrete. The remaining 10,032 feet of this large sewer are being built in tunnel,



THIRTY-NINTH STREET INTERCEPTING SEWER OF CHICAGO—LARGEST IN THE WORLD

and for a greater part of the distance, the earth above the springing line is wet running sand. The bottom throughout is of blue clay, with hardpan in the western portion coming up into the bottom of the excavation to varying heights.

MANNER OF TUNNEL CONSTRUCTION

The manner of constructing the tunnel section will be of interest. For this portion of the work a steel shield is used, twenty-four feet ten inches, external diameter, and about thirteen feet long. The front or cutting edge of the shield is of one-inch steel blade, and the tail piece, in which the construction is carried on, is of one-half-inch steel blade.

The interior is divided by partitions and platforms into pockets in which the excavation is carried on. The shield being used by the present contractor is fitted with thirty hydraulic jacks of five and one-half-inch piston, each capable of exerting a pressure of sixty tons. The outer end of the piston is fitted with a shoe which bears against the part of the conduit structure provided to furnish resistance. The work of construction is carried on the rear of the shield, as follows: The jacks are drawn back consecutively and oak cants, about four and one-half feet long, cut on one side to the radius of the circle, with an eight-inch face to the jacks, are built around inside the tail piece, tightly wedged, and spiked in place. When the full stroke of the jacks is thus built up and the pistons are back in their respective cylinders, the excavation is proceeded with the jack shoe bearing on the oak timber and the water pressure applied to the jacks, forcing the shield ahead. The stroke of the jacks is a little over two feet, and when this is run out the process of timbering is again commenced. An average of from 14 to 16 feet in twenty-four hours is thus made at the maximum rate of 23 feet in twenty-four hours.

In this manner a cylinder of wood is first built and by keeping this of a reasonable length, the mason work, which consists of building in a brick lining of one flat and four row lock rings, is carried on independently of, and without interference with, the advance of the shield. The number of brick, to the foot, is about 1,700, and the amount of cement used, per foot, about three barrels. This amount of cement is excessive, but is required to fill the interstices between the cants, which present the flat surfaces of the timber on the inside.

FIRST CONTRACT PRICE TOO LOW

The contractors who began this work were receiving \$88 per lineal foot of conduit for the tunnel portion, and were unable to complete it. A little over one-half the tunnel was re-let at a price of \$118 per foot. The present contractor has built about 1,600 feet since he commenced moving the shield in September last.

The vertical diameter of this conduit is wholly below the surface of the Lake, as in the case of the other one referred to, and the fall 1.5 feet to the slip, the greatest depth of the bottom being 45 feet below the street level.

The pumping station for this conduit is at the Eastern end, and the conduit will be worked under a head, as it is intended to discharge 120,000 cubic feet per minute of Lake water and sewage. The pumps to be provided by the city will discharge 40,000 cubic feet per minute of sewage and storm water from the large intercepting sewers over into the conduit. These pumps will be vertical centrifugal pumps, each direct connected to triple expansion condensing engines. Two pumps are to be used for the ordinary daily flow of sewage, each with a discharging capacity of 75 cubic feet per second, against a head of 24 feet, and two larger pumps to be used for storm water will each be capable of discharging 250 cubic feet per second against a head of 19 feet.

The principal intercepting sewer of this district is sixteen feet, inside diameter, at the well at 39th street, at which point the arch is three feet below the Lake level. In its construction the size will be slightly reduced as far as 73rd street, where it will be twelve feet in diameter and will receive the sewage from a system to be built south of 75th street, which will be pumped at this point.

It is interesting to note that this work is being done directly by day labor by the city. The magnitude of this large intercepting sewer may be better appreciated by the statement of a few facts. For instance, more than 35,000,000 brick will be required in its construction, and it will be four and one-fourth miles in length. Seventy thousand barrels of Utica cement, which has been exclusively used in the construction of this sewer, was supplied by Meacham & Wright, Chamber of Commerce Building, Chicago. Work on this sewer is now under way and it will take some months to complete it. It will make Chicago a cleaner city, help to purify the source of its water supply and reduce the death rate.

MILLIONS FOR WATER WORKS IMPROVEMENTS

The Problems Confronting Large Cities—Many Mechanical Filtration Plants Now Building—Boston Building Largest Storage Reservoir in Existence—Insures Supply for Fifty Years

DURING the coming season millions of dollars are to be expended for the improvement and extension of water systems in many cities. The aggregate amount so expended, if it could be accurately known, would astonish the most conservative. Many millions are involved



THE VILLAGE OF OAKDALE, WHICH IS TO BE REMOVED

in work already planned for or now under construction, in several of the larger cities, including New York, Philadelphia, Boston, Washington, New Orleans, Louisville, St. Louis, Pittsburg, Cincinnati, and Cleveland, as well as in many smaller municipalities.

The improvement of greater magnitude is in Boston. The Metropolitan Water and Sewage Board, which was created by the State in 1895, has the matter under its control. Since it began operation the Sudbury Reservoir has been completed, including the dam which was in process of construction at the time of the passage of the law authorizing the metropolitan work. It has also constructed an aqueduct twelve miles from the town of Clinton, through the towns of Berlin and Northborough to the Sudbury Reservoir, in the town of Southborough. It has completed a sewerage system for the town of Clinton, made necessary by the diversion of the waters of the south branch of the Nashua River, into which the sewerage was formerly emptied. The sewage is now disposed of by filtration, the filter beds being in the neighboring town of Lancaster. The great reservoir on the south branch of the Nashua River, includes territory within the limits of the towns of Clinton, Boylston, West Boylston and Sterling. It has been only partially completed. The north dike, which is two miles in length, is well along toward completion. The foundations for the Wachusett Dam have been made from the underlying rock to the surface of the river bed. An aqueduct from the Sudbury Reservoir in the town of Southborough, through the towns of Framingham and Wayland, to a distributing reservoir in the town of Weston, is now building, the object of which is to give a greater supply and pressure to the northern end of the Metropolitan District. Up to November 1, 1901, \$30,044,937

had been expended on this work. Of this amount \$16,287,736 was paid for land, water and business damages and general expenses; \$12,860,180.99 was paid for existing water works, principally to the city of Boston, and \$897,020.22 was paid for maintenance.

The large reservoir referred to, when completed, will be the greatest in the world, having a capacity of 63,000,000,000 gallons, and it will be located thirty-five miles northwest from Boston. From the total area of 4,200 acres of the Wachusett Reservoir, it has been estimated that some 6,600,000 cubic yards of earth will be removed. It is necessary to remove the soil to an average depth of one foot



A VIEW OF THE CENTRAL PART OF THE RESERVOIR WHERE WATER WILL BE NINETY FEET DEEP

from this entire surface in order that the water stored may not be contaminated by organic matter. For years a branch of the Boston and Maine Railroad has run across the center of the proposed reservoir, and besides, it included the thriving town of Oakdale. When the reservoir is filled the water will stand at a depth of thirty-six feet over the present site of the town. The magnitude of the task imposed upon the contracting engineers of this reservoir, can hardly be comprehended. Besides the soil there were six large mills, eight school houses, four churches, three hundred and sixty dwelling houses, a large Catholic cemetery and many trees to be removed.

Every phase of the work has been pushed forward in the most methodical way. Economy has been reduced to an art. A piece of work has been carefully blocked out, specifications drawn up and contracts awarded to the lowest bidder. For example, the contract for removing bodies, head stones and other appurtenances in connection with the cemetery, was let at the following prices: For the removal of each body, \$4.66 2-3; each monument, \$12.50; each head stone, \$4.50, and \$2,500 for all the curbing within the cemetery. The work of removing the 3,816 bodies buried in the cemetery was accomplished without a single case of serious dissatisfaction. Land for a new cemetery had to be purchased at a suitable distance from the reservoir, where the bodies were reinterred and head stones, foot stones and corner stones properly reset.

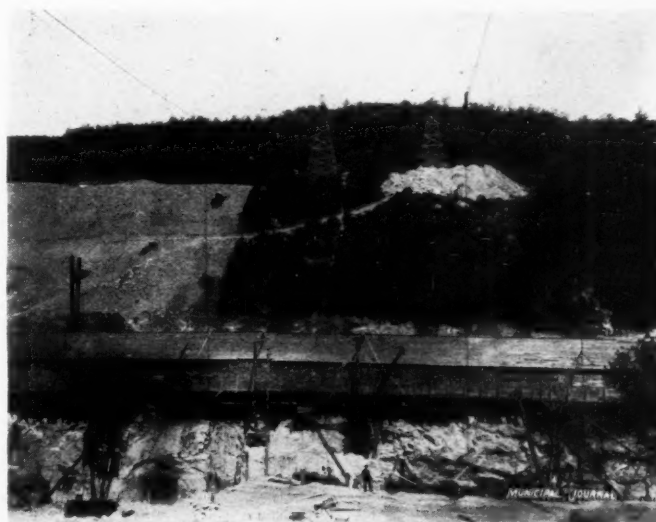
Up to date there has not been a single breath of scandal connected with the handling of the immense sum of money involved in this work. There have been no "jobs" of any kind. As rapidly as money was needed for carrying on the operations, bonds were sold in lots of from one to three millions of dollars at from three to three and one-half per cent. interest, for a long term of years—usually forty years. The premiums on the sale of these bonds have aggregated about two millions of dollars. When the work began, some seven years ago, it was thought the total expenditure would be limited to forty millions of dollars, but it now appears that this sum will be exceeded by several millions. At least three years will be required to complete the work.

Boston is more thoughtful for the future than any other American city. When this system is completed provision will be made for the next fifty years, for all demands for pure water, both for manufacturing and domestic purposes, not only for Boston, but for fifteen smaller cities in its vicinity. This estimate allows for the increase in population, and also a gradual increase in per capita consump-

tion. This is a forehandedness which is typical of the New England character and has not been paralleled by any other city in the United States. In the planning for this immense improvement in Boston's water supply every important phase of the question involved was carefully considered. At that time it was calculated that a supply must be provided equal to the needs of a population estimated at 1,100,000 on January 1, 1901, allowing for a natural increase on that basis until 1950. The population of the Metropolitan Water District did not equal 1,000,000 in 1900, so it will be readily understood that this is a most liberal allowance for increase in population and demands upon the water supply, and it is reasonable to suppose that the period for which this supply will be adequate will be longer than fifty years.

The next largest undertaking is in Philadelphia, where the problem is more intricate than in Boston. The present supply of the city is inadequate to its needs, as well as being impure. The survey which was made by a number of engineering experts two or three years ago in quest of a solution of the problem, revealed that a larger supply could only be obtained by draining a larger section of country and that to supply the citizens of Philadelphia with pure and potable water would necessitate the installation of an immense filtration plant. After due consideration and an examination of the merits of the two best known systems, the slow sand filtration process and the more rapid mechanical filter, the former was selected as the one best adapted to the needs of Philadelphia. Not long after the report of the experts had been submitted and approved, the City Councils authorized the issuance of bonds aggregating \$12,000,000, to be devoted to this purpose. Since then, according to newspaper reports, the disposition of the present municipal administration is to increase this amount by several millions. Unlike the Boston experience, there have been a number of charges of irregularities in connection with the promotion of this great improvement. Unfortunately the reputation of the Quaker City is not as good as that of Dame Boston.

In conclusion, it may be interesting to note that fully seventy-five per cent. of all the water works plants in the United States are owned and operated by municipalities. There is scarcely a large city in the country which does not own its water works. This is one of the instances where it is difficult to understand the reason for public opinion. In the construction, equipment, maintenance and operation



VIEW ACROSS THE VALLEY, SHOWING THE LOCATION AND SIZE OF THE DAM

of a water works system it takes greater skill to carry on such a business for the city profitably than it does to handle some other public utilities. For instance, there is less risk involved in the construction and maintenance of an electric light plant than in the former, and yet the larger cities are very slow to municipalize this public utility. The sentiment in favor of establishing municipal water plants is continually growing, and it will not be many years before the remaining twenty-five per cent., which is now operated under private ownership, will have been converted into city plants.

THE AMERICAN ROAD MAKERS

A Good Roads Organization with a Paid Membership and an Object—The Good Roads Senator of Michigan the Father of the Idea—State Engineer Bond of New York the First Vice-President—Larger Government Support and Capital Connecting Highways the Chief Aim

On the 13th of February last there was formed in the city of New York an association whose chief object is to agitate the cause of good roads. It will be known as the American Road Makers. One of its first aims is the construction of a system of highways which shall connect the capitals of the various states with Washington. One of the first appeals will be to the national government, to urge an appropriation of \$1,000,000 to be placed at the disposal of Hon. Martin Dodge, the Director of the Department of Good Roads Inquiries.

A UNIQUE ORGANIZATION

The organization is unique in that it will be the first in the field of a national importance which will have a paid membership and a definite object in view. There are other national organizations, so called, in the field, but they have absolutely no paid membership and no object which conserves the general public interest. The American Road Makers will have a membership of ten from each state, and ten only until four hundred and fifty members are secured, when an additional ten will become eligible to membership from each state. This will give the organization a representation that will be possessed by no other. Every state will have an equal voice in the transaction of the affairs of the association, and no section of the country will have a preponderance of representation, so that the West cannot say to the East, "This is an organization to promote the interests in your section," nor the North to the South. The interest will be common to all.

At the initial meeting every section of the country was represented—the Eastern states, Southern, Middle West and West. From each of these sections one of the chief officials of the organization was selected. There were present in person, or by proxy, twenty-seven members who will be known as charter members. The Hon. H. S. Earle, State Senator of Michigan, was made chairman of the meeting and Mr. William Pierson Judson, Deputy State Engineer of New York, was elected as secretary. After the usual preliminary steps were taken in the appointment of a committee on credentials, etc., the officers of the organization were elected as follows: For president, H. S. Earle, of Detroit, Mich., representing the Central Division; first vice-president, Edward A. Bond, of Albany, N. Y., representing the Eastern Division; second vice-president, R. H. Thompson, of Seattle, Wash., representing the Western Division; third vice-president, Judge E. H. Vasmer, of Houston, Texas, representing the Southern Division; treasurer, Col. W. L. Dickinson, of Springfield, Mass.; secretary, W. S. Crandall, of New York. The constitution was adopted and provisions were made for the framing and adoption of the usual by-laws. Those present paid their entrance fee and dues for 1902, and the American Road Makers' organization was launched.

THE FATHER OF THE IDEA

Senator Earle, who is the father of the idea, was interviewed at the close of this meeting by a representative of the MUNICIPAL JOURNAL AND ENGINEER. When asked about the origin of the idea he replied:

"The idea of such an organization first came to me in the spring of 1900 while making an address before a large number of enthusiastic road builders at Traverse City, Mich. From that moment I determined to bring about the formation of just such an association, for the sole purpose of furthering the interests of the good roads cause.

"As to the benefits," he continued, "to be derived from the work of such an organization it is not difficult to determine. Among others it is assured that it will give an added impetus to the good roads cause in the United States. I am so confident in the project that I would build this highway at my own expense, if the government would give to me the land abutting on this road on either side, one mile deep, outside the limits of incorporated cities, towns and vil-

lages, I to pay for the land at its valuation, per acre, prior to its enhancement by the proposal to build such a transcontinental highway. My point is, that I could make millions of dollars in the disposal of my options. Any one who gives this proposition a moment's reflection will see that so far as I was concerned I would be perfectly safe. It seems to me perfectly feasible and reasonable for the people of this great country to undertake the construction of such a highway. I believe it would be a wise investment upon which the people would realize a handsome profit if it were carried through to a finish.

INTERCAPITAL CONNECTING HIGHWAYS

"Subsequently I conceived the idea of an intercapital connecting government highway, built under the supervision of the government and belonging to the government. Such a scheme presents itself to me, as a business man, as a wise and economical thing to do.

"At the present time there is very little land or property which belongs to the Federal Government. Under present conditions a man is obliged to hunt for a post office, or a navigable lake, or stream, in order to get into or upon anything which belongs solely to the United States. I am free to say that I do not like to trespass upon another's property and I would like to be able to feel that there was at least one highway in every state upon which I could tour, afoot, awheel, in a carriage or automobile, with the feeling that upon such a highway I was as much at home in one state as in another—in fact that my citizenship would give me an inherent right to all the privileges which might accrue from the government ownership of such a road.

"The constitutionality of such an undertaking by the government might be questioned. But I am unable to see any real difference in the construction or improving of a waterway across the Isthmus of Panama, up the Mississippi, through the Sault Sainte Marie river, dirt roads in Porto Rico and the Philippines or a macadam capital connecting government highway. The cost of such a road would not be far from \$200,000,000, and I think it could be constructed within ten years after the formation of a definite plan.

"It would be difficult to overestimate the enhanced valuation of the property abutting on this government highway. The popularity of such an undertaking, it seems to me, would be assured from the beginning, for it appeals to bicyclers, automobilists, farmers and all classes of people who are obliged to use the public highway, much or little. It would not be many decades before such a transcontinental highway would present the appearance of a continuous city across the Continent.

"Naturally, we would start to build the road at the capital of every state in the Union, appropriating a certain amount of money each year until the last mile should be constructed. As to who would make the selection of the route to be improved, we propose to place that in the hands of a national commission which shall be appointed by Congress. The American Road Makers do not covet the responsibility of selecting such a route, but they are willing to co-operate with government engineers in every way possible so that the most direct and best route shall be selected. In all probability the experts under whose direction the road would be constructed, would be detailed from the Department of Good Roads Inquiries now under the direction of the Hon. Martin Dodge."

WHAT ENGINEERS BOND AND JUDSON THINK

State Engineer Bond and his deputy, Mr. William Pierson Judson, were interviewed by a representative of the MUNICIPAL JOURNAL AND ENGINEER, and both agreed that the project was not only a wise one, but could not fail to be far reaching in its results. Mr. Bond said: "There is a tremendous amount of energy wasted in the construction of highways in this country. It is wasted for lack of intelligent direction. The 'working out the road tax system,' now in vogue in the rural districts in most states of the Union, is one of the evils we

hope to correct. But outside of this particular part of the field, there is an immense amount of energy wasted annually, not to mention millions of dollars in money. There never has been a period in our nation's history when the sentiment for better highways has been so pronounced. Every state has its group of enthusiasts upon this question. Up to the present time there has been no effort made to concentrate this enthusiasm by thorough organization. I look upon the formation of this association as being most opportune in that it will have a tendency to so connect the influences which are working for good roads in each state, as to form an organization of national importance and great power. This will enable us to intelligently

direct the forces now at work for the betterment of roads, and so secure results throughout the nation. I realize from my connection with the practical work in promoting interest in road building under what is known as the Higbie-Armstrong Act in our state, that much good can be accomplished by this association of Road Makers, and personally I am very much pleased with the general plan as outlined by our president."

Those who may be interested to learn more about this organization will be able to secure the printed matter by applying to the secretary, W. S. Crandall, Postal Telegraph Building, New York City, New York.

THE FIRST MUNICIPAL ART EXHIBIT

Held at National Arts Club Last Month - Under Auspices of Municipal Art Society of New York

By Charles R. Lamb

THROUGH the courtesy of the National Arts Club of New York, its galleries were placed at the disposal of the New York Municipal Art Society, in which to conduct the first Municipal Art Exhibition ever brought together in the United States. It was opened formally on the night of January 29th by a banquet, at which the most serious municipal art problems now confronting Greater New York were discussed. From that date until February 27th the exhibition was open to the public from two to six o'clock. Thousands of people visited the galleries during that period. It is interesting to note in this connection, that since the Municipal Art Society was organized some years ago, several societies of the same name have been formed in other cities, notably Chicago, Cincinnati and Baltimore, and still others who are working along similar lines have been organized in a large number of cities. For this reason the New York society may be considered the parent organization. In accordance with the instructions of the executive head of this Society, the Art Committee arranged for this interesting collection covering municipal art lines.

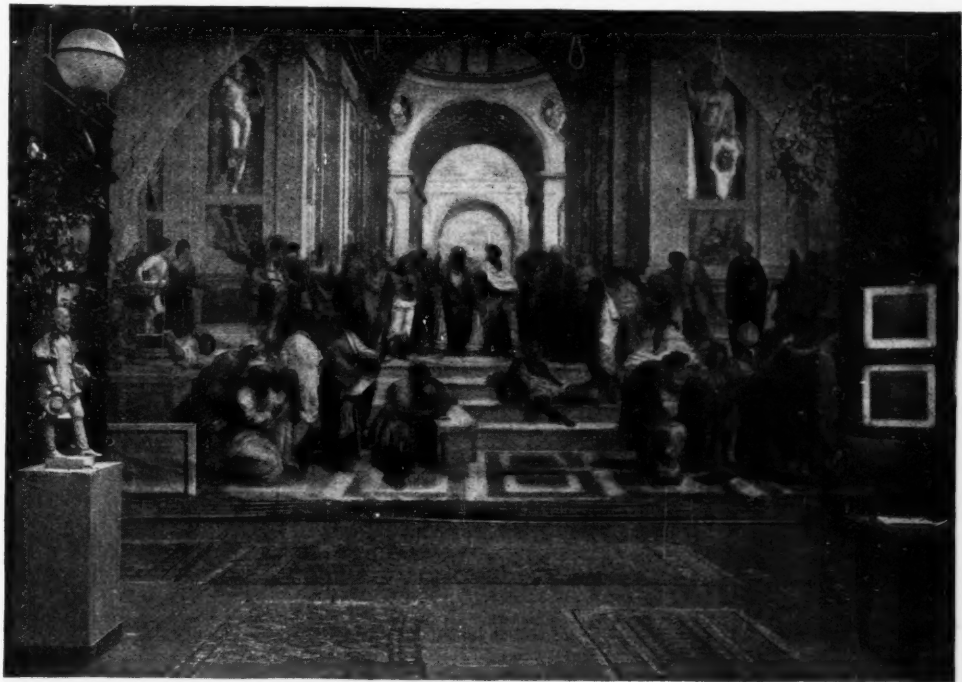
One of the most important exhibits—and which is deservedly given the place of honor—was the original competitive plan of Central Park. Messrs. Vaux and Olmstead, whose life work have closed but a few years past, show in this, their maiden effort, the great ability afterwards developed in the designing of Prospect Park, Brooklyn, as well as other plans throughout the country. The Society is under obligation to the Department of Parks of New York for its courtesies in loaning this exhibit, as well as to other departments for examples along their own lines, such as the important school buildings which have been constructed, or have been projected, under the direction of Mr. C. B. J. Snyder, Superintendent of School Buildings; also for the work shown through the courtesy of Mr. Gustavus Lindenthal, chief of the Department of Bridges, for the proposed great bridge across the North, or Hudson River. The Society is also indebted to President Cantor for the loan of the drawings for the proposed extension of Riverside Drive viaduct north to Boulevard Lafayette, which have been shown for the first time. This plan, prepared by the old Department of Highways, under the direction of Engineer Foyé, is one of the most impressive schemes for the beautification of New York City that will probably be executed during the life of this administration. It practically unites the Riverside Drive with that great boulevard which runs from Washington Heights, past old Fort Washington—marked by the Sons of the American Revolution this spring by an important monument—north to Spuyten Duyvil, and thus makes possible a tour of the city on the

west river bank, through the Harlem River Valley, down the Speedway and back into the heart of the city.

The Wallabout Market, Brooklyn, the one comprehensively designed market possessed by New York, is shown by two important drawings of the architect, Mr. William B. Tubby. Built upon land formerly owned by the United States for the navy, this market was made possible through the legislation secured by the Hon. William Jerome Coombs, who, representing the then city of Brooklyn, appreciated the importance of the idea and to whose untiring energy this scheme is largely due.

Similar propositions for comprehensive schemes in other cities are shown in many interesting designs, one of the most noteworthy being that received from the Chamber of Commerce of Cleveland, for the proposed grouping of the public buildings on the Lake Front, a scheme as yet undeveloped, but which has received the unqualified indorsement of all who have examined it.

Drawings by George Cary, Arch't., of Buffalo, also show interesting possibilities of the treatment of the Lake Front in connection with grouped buildings in his sketches for the proposed location of the



A COPY OF RAPHAEL'S "SCHOOL OF ATHENS" BY GEORGE W. BRECK

Pan-American Exposition at this point. The design by Downing Vaux for Kingston Point Park is also an interesting treatment of the same idea of a water front in connection with park and buildings. Possibly one of the most valuable of the park suggestions is that submitted through the Palisade Park Commission for the proposed Park and River Road to run from Fort Lee north to Nyack on the

west shore of the Hudson. This, although in embryo as to design, is most attractively depicted in a series of photographs emphasizing the natural beauties which will, within a short time, become the public possession of the citizens of New York.

Fairmount Park Association, of Philadelphia, the oldest of the associations interested in artistic matters, having been founded at the time of the Centennial, is remarkably well represented in enlarged photographs showing the individual works of sculpture and architecture, which, with their landscape setting, have added so much to the beauty of Fairmount Park and also to the reputation of their able Board of Directors.

Along similar lines, but less ambitious in their efforts, the American Park and Outdoor Art Association shows possible treatment in inexpensive form of architecture amid floral and foliage settings.

An individual description cannot be given of every exhibit and only a few of the principal ones are therefore touched upon, but in two directions of art work—sculpture and painting—a word should be said. In the former, naturally the memorial to the late Richard M. Hunt, with the erection of which the Municipal Art Society has been so prominently identified, holds one of the places of honor. Mr. Bruce Price, the architect, and Daniel C. French, the sculptor, are represented by the original models, as well as photographs of the completed work. In contrast to this the large doors and tympanum for the Historical Society building of Buffalo, by R. Hinton Perry, were erected at the end of the easternmost gallery, where the caryatides of the Metropolitan Museum, by Karl Bitter, have been decoratively placed at important points upon the wall. In the center a pedestal receives the original model of the proposed flagstaff by Chas. A. Lopez to be erected in front of the City Hall, New York,

to which was awarded the prize of one of the Society's competitions. Mural painting, a style of art which must in all civic work go hand in hand with sculpture, has by a coinciding of dates been most thoroughly represented. For a year and a half George W. Breck worked in Rome upon the great canvas, a copy of the famous "School of Athens," by Raphael, for the University of Virginia. This canvas arrived in New York, en route for its destination, a few days in advance of the opening of the exhibition, and thus it was possible to exhibit it in New York before being sent South to its final location. This is destined to form the focus of the great auditorium hall of the new buildings of the University, which have arisen Phoenix-like from the ashes of the old. An example of similar character with which the Municipal Art Society was definitely identified, is that of the mural painting, by Simmons, now in the Criminal Courts Building, is shown in photograph. This exhibition, the first of its kind, was remarkable from the universal opinions of approval expressed by the visitors and the favorable comments of the press. Surprise was expressed at the great variety and the wide range of subjects secured in which Municipal Art is a dominant factor. This surprise was, of course, not unexpected on the part of those members most deeply interested in the efforts of the Society past, present and future, but the great advantage of the exhibition has been to emphasize to the general public—particularly those who are candidates for membership—the *potentiality of art in the daily lives of all citizens*. If this exhibition does no more at the present moment than this it will more than pay the Society for the expense and trouble involved in its installation. If the exhibition is repeated from year to year, the good results to be secured will be greater than can be estimated at this time.

AMONG THE IMPROVEMENT CLUBS

Chicago's Municipal Art League—Women's Auxiliary of the American Park and Outdoor Art Association—Work of Hartford Civic Club

By Charles Mulford Robinson

THE Municipal Art League of Chicago publishes a Year Book and makes of the pamphlet not only a very interesting but, with its black and red, a very pretty publication—as befits a league for art. By way of date, the title page of the latest, which is also the earliest, bears in large letters the suggestive words, "Twentieth Century, Year One." The record is that of last year. Then comes a brief statement, taken from the by-laws, giving the objects of the league. They are: "To promote in every practical way the beautifying of the Streets, Public Buildings and Places of Chicago; to bring to the attention of the officials and people of the City the best methods for instituting artistic municipal improvements, and to stimulate Civic pride in the care and improvement of private property." The league is yet young, and it is of interest to see how it was started and how it has grown so strong.

For the full story of its origin and organization, it is necessary to turn to a separate publication by the league. It appears that on the 20th of April, 1899, a meeting was held at the Art Institute "to learn if the formation of a Municipal Art Society is desired in Chicago, and what steps might be taken towards organization." Fifteen persons were present, comprising painters, sculptors, and one architect. A call was prepared and issued for a larger meeting on June 15th in a private studio, and to this twenty-five persons came. A plan of organization was prepared and adopted. This provided for a board of twenty directors, of whom nine should be artists—three painters, three sculptors and three architects—while the rest should comprise six laymen, the mayor of the city, a representative from each of the three park boards, and one from the Board of County Commissioners. At the end of October a second studio meeting was held and the artist members of the board were elected. A month later these first directors met and appointed a small committee on permanent organization. At a meeting of the league on February 12th, 1900, this committee reported and a full set of by-laws was adopted. These changed the

board of directors as formerly suggested by dropping the representative of the County Commissioners, and providing that the city should have as official representative either the mayor or the commissioner of public works. The full board was named, and on February 20th it met and appointed a committee to nominate permanent officers. On April 6th, almost a year after the initial meeting, the league assembled and organized by electing these officers.

Now, all this is interesting as showing with what care and deliberation the league was started, and it is encouraging as showing that slowness at the start may mean a rapid subsequent growth. If any one who is trying to organize a municipal art society is discouraged by the slender attendance at the first meetings and the long time that elapses between meetings, he may take heart from this history. During all the following summer there was a recess, but on November 8th the directors met, took steps to become incorporated, engaged quarters, and appointed a committee on programme and work. It was January, 1901, before the league sought any prominence before the public. Thus its work did begin with the twentieth century.

The report of the committee on programme and work, which has been sent to this office, was a very interesting document, but it is far too long to quote. It recommended twenty-five lines of effort, divided about evenly between public improvements and private improvements. But the object that heads the list is the suppression of the smoke nuisance, "as a necessity for making all other improvements appreciable." It is significant that the society so promptly recognized and was willing to take up such a prosaic and practical department of effort, and it is yet more significant that its president, Franklin MacVeagh, in speaking at a dinner a few weeks ago of the Municipal Art Society of New York, was able to tell of the league's loyalty to this effort. After the smoke nuisance, the bill boards have perhaps come in for the greatest amount of attention, with the result that very severe ordinances have been put out through the councils

and are now being tested in the courts. Of the recent effort of the league to secure the co-operation of various local clubs, the MUNICIPAL JOURNAL AND ENGINEER has already spoken. The affiliation has been secured of more than a score of such clubs, all combining for an annual exhibition.

It ought to be added that the publication of the league's report on programme and work resulted at once in the arousal of a widespread interest and the accession of a great many members. It became a very vigorous and powerful organization for the physical betterment of Chicago, as an essential precedent to the city's artistic development. And if the special emphasis was put on the lines of effort we have mentioned, it must not be supposed that other opportunities were neglected. With its large membership, its representative position, its public spirited and aggressive leadership, the Municipal Art League of Chicago has made its influence felt for civic improvement in many directions. And it is so hopeful, confident and ambitious, that the end is not yet. The slow beginning is justified.

A Women's National Improvement Club

The Women's Auxiliary of the American Park and Outdoor Art Association has issued its annual circular, outlining its work of the past year, and describing its purposes and ideals. The chronicle is worth reading. It will be recalled that the association itself was organized "primarily for the purpose of preserving natural parks for public use, and of stimulating public opinion as to the value of parks as educators and sources of health," to use its own terms. It has now, however, taken upon itself a broader mission which is, briefly, "to cultivate a love of beauty in its application to public buildings and grounds, as well as to the homes of the people in city and country." The Women's Auxiliary aims to further these objects by securing the co-operation of women "who desire that the localities in which they live shall be made clean, healthful and beautiful." For this purpose it aims to obtain a wide and extending field of influence through affiliation with the General Federation of Women's Clubs. Membership in the auxiliary includes membership in the association and the receipt of all reports and other papers which the latter issues. Among the members of the association are many landscape architects, and since they are willing to give advice gratuitously in matters of public beauty, to supporters of the association, the auxiliary becomes a sort of bureau of information, where "advice can be obtained by persons interested in the preservation of natural beauties in town or country; in the improvement of school buildings and their surroundings; in the elimination of bill boards that mar urban and rural landscape; in the care of trees and in the selection of appropriate sites for monuments and fountains."

As to the ideals of the auxiliary, it declares itself "greatly" in favor of "the extension of breathing spaces and properly equipped public playgrounds." It desires that the schools should be centers of attraction in their neighborhoods, good examples of architecture, and should inculcate a love of nature—to the great enhancement of their educational value—by a wise treatment of the school grounds. In this connection the auxiliary puts itself on record as believing that where the children are interested there will be no vandalism, and therefore that "Keep Off the Grass" signs should be removed. It would persuade factory owners to improve the forbidding aspect of their premises and considers the abatement of the public advertisement nuisance "a matter of national concern."

During the last year the auxiliary has organized a local committee, or chapter, in Chicago and one in Milwaukee. The work which these are doing includes the beautifying of an entire city square, the creation of separate gardens in tenement districts, of a child's garden in a settlement, the embellishment of school grounds, the distribution of flower seeds, and the award of money prizes to stimulate outdoor improvement.

Hartford Civic Club

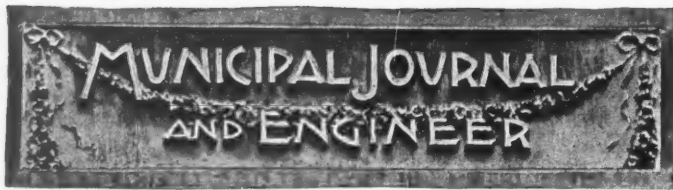
One of the most interesting reports that has come to this department during the month is that of the Civic Club, of Hartford, Conn. It contains a history of the society's six years' existence and the interest lies in the showing of what can be accomplished in a city of moderate size by a club of women who pay annual dues of only one dollar, and whose number, by the restrictions of a by-law, cannot exceed 150. This club, I have been told, was formed quite unexpectedly at a social luncheon when the city's appearance happened to arise as a subject of conversation. In its six years of life a great deal has been done of which it is impossible to make any statistical account. This includes the holding of conferences, formal and informal, with the various city boards and officials, and the arousing and maintenance of a public opinion that demands physical and moral well-being and cleanliness in Hartford.

In its first year, 1895, the club sent out a circular letter to property holders and tenants in the business section of the city asking their co-operation in the effort for cleaner streets; on its petition, also, the Common Council set about the city waste cans for the reception of rubbish, and later on passed an ordinance, again on the Club's petition, prohibiting the throwing of paper and other refuse in the streets. General meetings were held, also, at which addresses were made. In 1896, in addition to such meetings, there was a public meeting, at which the late Colonel Waring spoke, and the Club was instrumental in having a drinking fountain set up in Union Place. In the following year there were addresses, photographs were presented to the schools, and a vacation school was opened. In 1898 and 1899 the same lines of work were carried on, but on a larger scale, the 150 pupils at the vacation school of 1897 growing to 700 in 1899, with a corresponding increase in the number of teachers. There are now two schools instead of one; the Hartford *Courant* was collecting by public subscription from \$1,300 to \$1,500 a year for use by the Club in this way; a reading room had been opened, and a playground. All this work has grown steadily, so that last summer there were 2,300 children gathered in the several vacation schools, nineteen boys had school gardens, the Club was conducting a kindergarten in Riverside Park and a camp for boys in the Adirondacks. It appears to have drifted somewhat away from the original city improvement effort; but this change may be less real than apparent. In 1897 the Club appropriated \$50 for the improvement of a street and brought to bear in its behalf an influence that was worth a great deal more.

That the Club has become a strong aggressive power for good in the community is clear; but the passive influence of its high civic ideals is not as easily to be measured. It may be that Hartford, because of this, is keeping, both officially and popularly, to a higher standard than before. Certainly there is in the Civic Club, should things go wrong, a power to announce the fact loudly and to set them straight again.



THE SKYLINE OF DETROIT—VIEW TAKEN FROM THE RIVER



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SELF-GOVERNMENT FOR CITIES

CITIES, like women, have only homeopathic rights in most of our states. This may explain, perhaps, why we call a city "she," though there are other reasons for thinking of cities as feminine, for men fall in love with them, are lured and captured, ennobled and debased, courted and jilted by them. At common law there are three sorts of creatures without any rights, namely, wild beasts, outlaws and municipalities. Any citizen may take the life of the former and any legislature may take the life of the latter. In the language of our law a city is "a creature of the legislature." Cities must get permission to move, or even to exist as municipal bodies. The legislature gives them such powers as it pleases, abridges at will or annuls their privileges, may even divide them or consolidate two or more of them into one without their assent, attach a condition to their continued existence, or abolish them completely. Imagine Congress passing an act to annex Rhode Island to Connecticut, or divide New York state, or declare that Illinois shall no longer be a state. Yet such an act enforced without the assent of the states affected would be an apt parallel to the arbitrary powers possessed and exercised by many of our legislatures in respect to cities.

A few of our states have given cities something like a reasonable control over their own internal affairs, and in most of our states the actual practice of the legislature is to allow the municipalities a considerable degree of liberty. These privileges, however, are held, not as rights, but at the pleasure of the legislature, whose arbitrary power is too often used to the serious detriment of municipal progress and good government. The importance of municipal government in this country may be realized from the fact that there are only three states, Illinois, New York and Pennsylvania, that have so large a population as the city of New York; twenty-nine states have less population than Chicago, and fifteen states are smaller than Boston. The problem of municipal government is the most important of the political problems of our time, and municipal liberty is one of the keys to its solution.

A few years ago the Boston Common Council voted unanimously in favor of establishing a municipal electric light plant, but the city was powerless to act without the permission of the legislature and the legislature was controlled by the electric light companies, so that the city could not get permission even to light its own streets. A little later Boston desired to run an electric wire between two of her own city buildings. There was a dynamo in the city hall and if a wire could be run from this dynamo under a little fifty foot alley to

the old court house, the electric lights in the latter could be supplied with current from the city hall dynamo, so saving to the city a large part of the price paid to private companies for lights in the court house, but the electric companies blocked the way in the legislature and the city could not get permission even to run a wire between two of its own buildings.

Detroit has had a sad experience under this principle of municipal subjection. The effort to establish a municipal system of street railways failed because the city was denied the right to act according to its pleasure in this matter of local business, the denial in this case being based on what was, as I believe, a misinterpretation of a constitutional provision intended to prevent the state from going into the steam railroad business.

The city should have the right to keep house for itself in its own way. It is no more just or sensible to require the city to consult the representatives of all the other cities and towns in the state and get their permission when it desires to make a change in some local matter, than it would be to require Mrs. Jones to get the consent of all the other ladies in her city whenever she desired to scrub her floors, or change the paper on her walls.

Recently Philadelphia has had another serious encounter with this doctrine of municipal infancy, or infamy, whichever way you think best to put it. Under the influence of the Quay machine the legislature granted a ring of conspirators valuable street railway franchises in Philadelphia and the City Councils and the mayor endorsed the bills. John Wanamaker offered two millions and a half, and later three millions of dollars, for these franchises, but in spite of this they were given to the Quay conspirators without a dollar of compensation to the city, and without the slightest power in the people of the city to affirm or disaffirm the contract.

The charter of a private corporation is held to be a contract protected by the Federal constitution, but the charter of a city is held not to be a contract and is not protected by the national constitution. So a franchise granted by the legislature to a city or town is not a contract, but a franchise granted to a private corporation is a contract. A franchise to establish, own and operate ferries, water works, gas works, electric plants, street railways, etc., is a franchise if granted to an association of stockholders constituting a private corporation, but is not a franchise if granted to an association of individuals constituting a city, and in the latter case is not protected by the constitution, or anything else, but may be taken without compensation at the pleasure of the legislature.

Municipal government has a two-fold character; on the one hand it is an agency of the state to deal with state affairs, and on the other hand it is an agent of the municipality to deal with municipal affairs. In the first relation its functions are political and governmental; in the second, its functions are largely similar to those of the directors of a business corporation whose stockholders are the citizens of the city. Most of the difficulty and confusion in municipal law has come from the failure of constitutions, legislatures and court of law to draw the line between these two sets of functions with proper strength and clearness.

The remedy lies in establishing a separation of state and municipal interests, similar in substance to the separation established by the federal constitution between state and national interests; the principle of decentralization, or the nearest possible approach to individual freedom, being always the guide; no liberty should be taken from the individual and given to any public body unless the transfer is clearly for the public good; no liberty within the public sphere should be taken from the municipality and placed in a wider grasp unless the wider public good requires it; and no liberty of the wider class should be taken from the state and given to federal power unless the national good demands it.

As a business corporation dealing with property for municipal revenue, service, or advantage, establishing water works, gas plants, telephone, electric light, and street car systems, markets, bridges, ferries, parks, etc., the city should have the fullest discretion subject only to broad limitations in respect to debt, unanimity, submission of measures to the people at the polls, etc., to prevent improper haste or ill-considered action, or possible tyranny of majorities, or injustice to private individuals or companies. The municipal debt limit ought not to apply to debts for water, gas, electric or street railway plants,

or other debts for which assets can be shown. The fair value of saleable assets should be subtracted from the debt before the limit is applied.

In this relation of local business manager the municipality is an organization for the common benefit of its citizens, and its government an agency whose duty it is to do all in its power for the prosperity and advantage of its principals. In respect to state interests, the municipality occupies a subordinate position; yet even here it should be free to act so long as it does not conflict with state arrangements. For example, the preservation of order and prevention of infection are state affairs, but they are also of prime importance to every municipality, and it should be free to establish a police or health department of its own where the state does not act, or in addition to the state agencies where it does not deem them sufficient; in other words, it should have a sort of concurrent jurisdiction of state interests within its own domain, wherever the state does not claim exclusive jurisdiction.

It may not be an easy matter to arrive at a satisfactory division of state and municipal functions, but it can hardly be more difficult than the separation of state and national functions that was so satisfactorily accomplished by the makers of the Federal constitution. Perhaps it may be well to try a similar plan in the present case; a convention of distinguished judges, statesmen, philosophers, etc., might at least be able to arrive at conclusions that would greatly facilitate a solution of the problem, and give the courts and constitution makers of the various states a standard that would help to mould the law of the country into at least a semblance of consistency and wisdom on this vital topic.

FRANK PARSONS.

FOOLISH OPPOSITION TO METERS

UNDER the caption, "The Folly of Meters," our esteemed contemporary, *The Dispatch*, of Columbus, O., condemns the proposal of the Director of Public Works of that city to purchase 10,000 water meters to be applied to the domestic service in the water department. *The Dispatch* starts off with the proposition that, "The people of Columbus have a right to know whether the proposed meter imposition is going to bring about any one of the three elements of water supply that comprise the sum total of the water needs of this city. Will these meters vouchsafe to the city abundance, purity and cheapness?"

If *The Dispatch* only knew a little more about the subject its reasoning might be a trifle more logical and lucid. There are many well conducted water departments in the country which use large numbers of water meters and always for the benefit of the city. The use of the water meter in a well organized department does bring about the very state of affairs which is so ignorantly questioned by *The Dispatch*. It certainly does insure purer water supplies, a wider and free use of water, the extension of sewerage systems and their introduction into smaller cities and towns, and the prevention of needless waste on the part of the consumer.

By the use of the water meter the improvement of the supply would be insured because waste would be prevented and the enormous volume which would otherwise be required to meet current demands would be largely reduced, so that it would be comparatively easier to purify any given water supply by filtration than if a city were obliged to purify millions of gallons daily which were to be wantonly wasted by the careless water user. One example will be sufficient to verify this statement; that found in Buffalo, where the same sentiment prevails against the use of water meters. As we have stated in these columns many times before, Buffalo wastes more water per capita than any other city in the world. Its per capita consumption amounted to over 300 gallons per day last year. Even with 100 gallons per capita, which is a most liberal allowance, it would indicate the enormous waste of over 200 gallons. It has been demonstrated repeatedly in other cities that where the water meter is introduced it has checked water waste. As Buffalo pumps every gallon of its water, and every thousand gallons takes a certain amount of fuel, just in the matter of the coal bill alone it would save thousands of dollars annually. What applies to Buffalo applies to Columbus.

Wherever water meters have been introduced reductions in the charges to the consumer have been made possible. Moreover, the introduction of the meter system has invariably extended the use of water among people of moderate means and by the very poor, many of whom, under schedule rates, have access to but one faucet for drawing water. That is usually located over the kitchen sink or in some hallway or yard. Cold water is all that can be drawn from this faucet, which materially lessens its usefulness for sanitary purposes. Meters have a tendency to lower water rates, though the saving in rates already referred to would make it possible for even poor families to own and use stationary wash tubs, bath tubs and lavatories, because the consumer would only have to pay for water by the thousand gallons. It has been demonstrated again and again that the small water consumer in Buffalo—or one having only one faucet—allows more water to run through that one faucet than the largest consumer on Delaware avenue, the swell street of the city. That the water meter saves money for the city as well as the consumer has been proven repeatedly. If *The Dispatch* will extend its investigation a little further it will be able to verify all these statements and instead of wasting its strength in talking about "the folly of water meters" it will talk more to the point on the advantages of water meters.

If *The Dispatch* were to fire its broadside at the political influences which work detrimentally to the administration of the water works department of Columbus, it would come more nearly the bull's eye. No municipal department in that, or any other Ohio city, has suffered more from machine politics. It was not such a great while ago that with a strong pull an ordinary grocery clerk succeeded in obtaining the position of chief engineer at the pumping station. He undoubtedly knew how to sell groceries and tie up packages, but he was totally ignorant of how to run a pumping station or a pumping engine; as a matter of fact he did not know enough to act as fireman. The Water Works Department of Columbus needs, first, to be cleaned of politics, and next, the universal introduction of meters.

GOOD LUCK TO PATERSON

THE city of Paterson has obtained rather a bad reputation within the last two or three years because it was the home of the assassin of King Humbert, because of the Bosschietter case, and several other local incidents that gave it unpleasant advertising. But its sins have been purged away by the recent fire. Headed by its chief executive, Mayor Hinchliffe, it has risen to the occasion and given a splendid account of its inherent energy and enterprise. Many larger cities would have been crippled by so large a conflagration. The usual spectacle would have been a stricken and grateful municipality, with relief rushing in from every point of the compass. Under the leadership of another mayor such might have been the case in this instance, but the outside world, as well as Paterson, soon discovered that the burning city had another programme.

The Mayor of Paterson had a mind of his own and the courage of his convictions. The town went wild with frenzy under the excitement of the burning city, but Mayor Hinchliffe kept his head. He not only saw what was needed, but immediately set in motion the city's machinery to reduce the danger to a minimum. For instance, he relieved the police with the militia, closed the drinking places and shut off totally the turbulence and crime which have invariably attended great fires. Late on the night of the fire and all the following day, offers of help poured in, but to one and all the Mayor replied: "Paterson needs no charity. She can care for her citizens herself," thus evincing a sturdiness of character to be coveted by other mayors in the United States.

Hundreds of people have been made homeless, and millions of dollars worth of property have been destroyed by this, but the new Paterson will arise from the ruin. It is more than likely that Mayor Hinchliffe will continue to show his wisdom by taking the most modern precautions in rebuilding the congested centers. With the emphasis of the recent events, he will probably find it a comparatively easy matter to secure the adoption of such regulations in the construction of buildings as will reduce to the minimum the danger

of another fire. He will be afforded an opportunity to straighten and broaden some of the streets, improve the general appearance, and introduce some of the modern ideas of municipal art. The laws and regulations covering the construction of buildings in European cities are far more stringent than on this side of the Atlantic. It costs more to put up a public building on the other side than it does on this because the materials employed in construction are of a more expensive character, owing to the fact that fire-proof conditions are insisted upon. That these restrictions are effective is evidenced by the fact that foreign cities nowadays are not visited by conflagrations similar to those which are of all too frequent occurrence, in American cities. The list of fires similar to those which visited Waterbury and Paterson is long and appalling in its aggregate loss of human life and property. For instance, New York City was burned in 1835, when 674 of its best buildings were destroyed, with a total loss of \$7,000,000. Chicago's big fire in 1871, made 98,500 people homeless and destroyed property worth \$190,000,000. The Boston fire of 1872 caused a loss of \$80,000,000. In 1900 the cities of Ottawa and Hull, Canada, suffered a loss of \$17,000,000. Two months later the docks of the North German Lloyd Steamship Company, at Hoboken, went up in smoke and there was an appalling loss of life, besides the destruction of \$7,000,000 worth of property. Jacksonville, Fla., was almost destroyed last year. The wonder is not that these fires occur in American cities, but that they do not occur more frequently. Nearly every southern city presents conditions which really make it a matter of wonderment that fire has not utterly destroyed them before this. The chief executives and legislative authorities in our municipalities need to give these matters the most careful attention. It may cost more money to build fire-proof buildings, but it is certainly more economical in the long run.

EDITORIAL COMMENT

THE New York Legislature is considering a bill which will make it possible for cities and villages to vote upon the question of municipal ownership, when one-fifth of the voters petition for it. The people own the streets and the rights of way which are so often granted to private corporations, and sometimes their wish to own and operate certain public utilities is ignored by the grasping corporation through the influence of the corrupt politicians. This bill should become a law, not only in New York, but in every other state.

Mr. Andrew H. Green, president of the American Scenic and Historic Preservation Society, is supporting a bill introduced into the New York Legislature which proposes a tax upon advertising posters. It provides a tax of one cent for every two square feet for all publicly displayed posters, excepting only legal notices and signs pertaining to the business conducted on the land where they stand. This is a matter which should engage the attention of every leading city in the United States. The bill board nuisance has reached a point where its abatement has become a necessity.

THE city fathers of Louisville propose to make ministers who enter politics pay for the privilege. An ordinance has been prepared providing that ministers of denominations shall pay a quarterly license of fifty dollars, and that the attorney of the sinking fund shall garnish their salaries in the event of non-payment. The ordinance provides that all ministers, of whatever denominations, shall be required to pay a license for the reason "that of late they have been trying to butt into politics and attempting, by advancing unwise theories, to take a hand in the conduct of municipal affairs." It is to be hoped, for the sake of the ministers, that this ordinance will not pass. It may answer as a poor joke, but nothing more.

A STATEMENT was recently made by a New York official who professed to know, that the city loses more than a million dollars a year by tricks and devices of large consumers of water who use water meters. For this reason a bill has been introduced into the Legislature prohibiting interference with water meters. By a strict enforcement of such a law it is expected that the city will be the

large gainer. An investigation by the new officials who recently took charge of the New York water department, revealed the fact that there were many users of water who paid nothing for their privilege, for the reason that an accurate record of their service taps was not on file in the water department. This is by no means a novel experience. Other cities have had similar trouble, and in all probability if a careful inspection were made of even a well conducted department, it would reveal a few irregularities of this character. And if such revelations are possible in a well ordered department, what can be expected of one which is poorly conducted? Next to the introduction of water meters throughout a water works system, we know of no action which promises to be so fruitful of good results as the conduct of an honest and vigorous investigation of the water department once a year by a disinterested committee. By such means the consumer, instead of being able to "fix" his water meter so as to make them read to his profit, would be "transfixed" by the law, much to the profit of the city.

"THE voting machine," remarks our contemporary, the *Toledo Blade*, "is winning its way, despite the opposition of political heelers, and that residuum of ignorance in the body politic which stubbornly set its face against any improvement which compels men to exercise a little common sense, and to learn a few new things. A case arose in Buffalo at the last election. That city used 108 machines, and the claim was made that, late in the day, one of them did not work properly. The specific charge was, that voters could not split their tickets. The trial of the case showed there was no foundation for the charge. Those who followed instructors could split as they pleased, and had no trouble in voting exactly as they chose. If any one failed to accomplish his purpose, it was because he did not follow instructions. The supreme court therefore decided in favor of the machine. In point of fact, voting by machine is quite as simple as using the Australian ballot, and a man without the intelligence to follow the directions for voting is certainly not wise enough to use the ballot intelligently." According to the *Hartford Times*, that city would save money by the use of voting machines. It will be seen by any one who takes the trouble to investigate, that the use of the voting machine not only insures an accurate record of all votes cast, but is also a saving to the city, as it has been repeatedly demonstrated that the machines pay for themselves in a few years in the expenses involved in running an election. It costs less to run an election with voting machines than it does with the old system now in use.

ACCORDING to the *Pittsburgh Dispatch* it was "dirty politics" which brought about the recent resignation of Mr. John Brunner, superintendent of the City Bureau of Engineering and Construction. "Mr. Brunner," said Director of Public Works Bigelow, "is a splendid engineer. His services could easily be worth \$25,000 to the city. Mr. A. B. Shepard, connected with the water works department, is also a competent engineer, but he is not allowed to go on the reservoir work, although he is required to sign and approve the official papers. The engineers now employed by the city are doing practically nothing but draw their salaries. They are not allowed to work; they have done nothing for months." If this statement be true it would seem to us that for politic reasons, if not for a higher motive, the "political boss" of Pittsburgh should give these high grade engineers, as well as other city officials, the opportunity to employ their abilities in the interests of the city. Mr. Brunner was obliged to resign, it is said, in order to retain his self-respect, as he refused to employ "ward heelers" in his department. Politics have a legitimate place in the administration of civic affairs, but they should not be allowed to force the employment of unskilled or untrained labor in any one of its departments. There are some politicians who are broadminded and wise enough to use some discrimination in filling the appointments subject to their disposal, so that competent men are appointed. In this way we can readily understand how any party with such leaders could fill all its appointments in such a manner as to preclude the possibility of loss to the city. Pittsburgh, as well as some other cities, has something to learn along this line.

"WHAT I see in Washington that pains me," said Mr. Andrew Carnegie the other day, "is the insidious introduction of soft coal.

You may beautify the Capital, but this nuisance will recall to future inhabitants the entrance of the serpent into the Garden of Eden. This feature alone would determine my choice as a residence between New York and Washington, and this is a choice which several of my friends have had to make. Unless Washington is to be free from this cloud it will never be what it might be and what it should be as the National Capital." Mr. Carnegie is not alone in recognizing the evil which threatens the beauty of our National Capital. It is a menace not only to Washington, but to every other large city in the United States. In New York City, which is freer from smoke than any other, there are some offenders, among which are the authorities in charge of several of the Federal buildings. The chimneys of the New York Post Office, for instance, pour forth volumes of black smoke daily. With the modern appliances for the prevention and consumption of smoke, there is no excuse for a continuation of the nuisance in any city. With wise state and local legislation, backed up by a vigorous smoke inspection department, any city can rid itself of black smoke if it will. Most cities lack the will, because they have the idea that where there is smoke there is money. The authorities too often believe that if they enforce a smoke ordinance it will drive the manufactories from their midst, but a wise and just enforcement of such regulations would soon convince the manufacturer that it was a paying investment for him to install a downdraft furnace or a smoke consumer, as it has been repeatedly demonstrated by many leading manufacturers throughout the country, that a saving of coal is obtained by the use of such appliances.

THE *Minneapolis Journal*, in a recent editorial, declares that "the system which prevails in the country of 'working out' road taxes ought to be abolished." Continuing it says: "One look at the typical 'worked out' road should be enough to convince one that the system is bad. A 'worked out' road is generally one which wagons and carriages make a long detour to avoid. A little sinkhole swamp or lake straight is preferred by most drivers to the combination of lake, swamp and quicksand efforts that are so admirably united in a 'worked out' road. The idea of the farmer who has a road to 'work out' is to go to some place where there is a low spot in a road and then scrape up a pile of dirt, the better mud-producer the dirt is the better for the purpose of the roadmakers. This dirt is left piled in hummocks with deep depressions between. No semblance of a grade is maintained. The whole idea is to make some sort of showing for the day's work. So far as tends to the end of improving the road, making the grade better and reducing the strain on teams and vehicles, it is usually worse than useless. If the money this wasted labor represents were placed in the hands of a competent engineer, it would in the course of a few years give every county in the state good roads in all the places that now enjoy a local fame for the obstacles the roads offer to the passage of wagons. It is to be earnestly hoped that the American Road Makers, recently organized in New York, will take an active hand in bringing about the early reform of this abuse in every state in the Union. Moreover, it should have something to do in securing the adoption of wide tires, both for city and country, as our roads and streets are greatly damaged annually by the present use of the narrow tire.

THE Empire State is rapidly forging ahead and will soon become the leader in the good roads movement. New Jersey is the pioneer state in the good roads work, Connecticut and Massachusetts following. It is only within the last three or four years, and under the direction of State Engineer Bond, that New York has deserved anything like creditable mention for the betterment of its highways. Under the leadership of Mr. Bond, and with the co-operation of the Legislature, the sentiment favoring the general betterment of New York's highways has developed into large proportions, so that last

year the demand for good roads from certain counties in the state, under the provisions of the Higbie-Armstrong Act, far exceeded the appropriation which had been made. For this reason Mr. Bond determined to make a larger demand upon the State Treasury for road improvements for the coming decade. This matter was presented to the members of the Third Annual Convention of Highway Commissioners, a full account of which will be found elsewhere, who indorsed his proposition with but one dissenting vote. When it is remembered that other cities of the Union are spending hundreds of thousands of dollars annually to better the condition of their highways, and when the fact is taken into account that New York has done comparatively little in this direction, the necessity for acceding to this request of the State Engineer will be readily appreciated. For years the State of Massachusetts has spent \$500,000 annually in building and improving its roads. By this means it has saved the rural population of that State from thirty-three to fifty per cent. in the annual outlay for horses and vehicles; and the increase there in the value of real estate, as a direct result of the commission's efforts, is said to be enormous. The cities of New York State will pay ninety-three per cent. of the proposed State tax, the returns from which are to be devoted to the betterment of New York's highways. The experience of those states which have undertaken, upon a liberal basis, the improvement of their highways, warrants the assertion that it would be a most profitable investment for every state in the Union to follow the example of the leaders in this movement.

MAYOR DRENNEN, of Birmingham, is one of the progressive chief executives of the South. He is interested in the progress of that entire section of country, as well as of his own municipality. For this reason he has become one of the leaders in the good roads movement which has been attracting such widespread attention in the Southern States. At the recent session of the Interstate Good Roads Convention at Charleston, he secured the passage of the following resolution: "Resolved, That it is the sense of this Southern Interstate Good Roads Convention, that whereas the highways of the United States are a disgrace to our advanced civilization, and that this condition is largely due to ignorance as to the best methods and materials necessary to their proper improvement; and that this condition is attracting the general attention of the people of the whole country who are anxiously inquiring as to the best means for changing them, and the need for experimental and educational work is greater than ever before, and that this work can be done by the General Government at no greater expense for the whole country than would be required for a single state to make the investigation for itself; and that the time has now come when the office of public road inquiries of the United States Department of Agriculture should be enlarged into a bureau and supported by such larger appropriations as will enable the secretary of agriculture to extend this investigation and educational work to all sections of the country; and that the Secretary of Agriculture be empowered and instructed by Congress to appoint one special agent for each and every state in the Union, who shall be a resident of the state for which he is appointed, and who shall devote his entire time to the betterment of the highways of the state." Its sentiments are such as will commend it to the favorable consideration of every good roads convention, whether large or small, because it will be a comparatively easy matter to adapt it to the needs of each locality. That which favors a more liberal appropriation on the part of the general government is sure to meet with hearty approval everywhere. The Hon. Martin Dodge, Director of the Goods Roads Inquiries, should certainly be given a larger sum for the conduct of his department, as it deals with one of the most vital questions of the day."



LETTERS TO THE EDITOR

A CORRECTION

PHILADELPHIA, February, 3, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

In the February number of the MUNICIPAL JOURNAL AND ENGINEER, on page 75, under the heading, "License Fees Charged and Amounts Collected in Five Cities," I note that, under the heading "Philadelphia" you state that the amount charged for street cars per car is \$10, and the amount collected in \$942.

This is an error. First, the fee is \$50 per annum per car for each car run or intended to be run during any given year, and the amount collected during the year 1901 from the Passenger Railway Companies from said license charge was \$94,200.

I also see in your foot note that in Philadelphia the street cars with one horse pay \$25 and with two horses pay \$50. There are no horse cars in Philadelphia. All passenger railway cars are run by trolley and the fee is \$50 per annum for each car and \$50 additional for each car crossing any of the city bridges.

WM. H. BROOKS, Chief, Bureau of Highways.

HOW TO BUILD CITY CHARTERS

SHREVEPORT, La., February 1, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Please let me know if you have any formulated organic laws especially related to city charters, or for embodiment in municipal laws, or books on such matters, and how and where the same can be procured, the probable cost, etc. We are in the throes of a demand for a change in our city charter, and probably can secure a standard form based on our American theories of government, flexible enough to meet every phase of growth and progress. We have had four charters in as many decades.

ANDREW CURRIE.

Many articles have been written upon this subject as well as many books, of which the principal ones of the latter follow. There has been no contribution to this subject of greater value than that which may be found in the "Proceedings of the Fifth Annual Meeting of the National Municipal League," listed below. Among the books listed are "City Government," the lesson of popular government, by Gamaliel Bradford. The Macmillan Co., New York, 2 vols., 8vo., 520 and 590 pp. \$4; "Municipal Government in Europe," Ann Arbor Studies in Finance and History, Michigan University, by Richard Hudson. Michigan Univ., Vol. II, No. 4. 25c.; "Government of Cities," by Frank S. Hoffman, Chap. XI, p. 187, "Sphere of the State," London and New York, Putnam, 1894, 275 pp. \$1.15; "Government of Cities," by James Kendall Hosmer. Pp. 298-307; "Short History of Anglo-Saxon Freedom," New York, Scribner, 419 pp. \$2; "Government of Cities," by George W. Walthew. (Chapter V, in "The Philosophy of Government.") G. P. Putnam's Sons, New York. 12mo., 207 pp. Cl. \$1.25; "Government of Municipalities," by Dorman B. Eaton. The Macmillan Co., New York. 8vo., 526 pp. Cl. \$1; "Municipal Government," by Simon Sterne. Pp. 257-74 in his "Constitutional History and Political Development of the United States." Cassell, New York. 575 pp. \$1.25; "Municipal Government," by S. E. Moffett. Chap. VII, p. 86, "Suggestions on Government." Rand, McNally & Co., Chicago, 200 pp. \$1; "Problem of City Government," by L. G. Janes. D. Appleton & Co., New York. 40 pp. 10c.; "Study of City Government: An Outline of the Problems of Municipal Functions, Control and Organization," by Delos F. Wilcox. Macmillan Co., New York. 12mo., 268 pp. Cl. \$1.50; "Proceedings for the National Municipal League" for the years 1897, 1898 and 1899, \$1.00 each; "Cosmopolis City Club" (a story of municipal reform), by Washington Gladden. Century Co., New York. 135 pp. \$1; "Good Citizenship" Essays on "Social, Per-

sonal and Economic Problems and Obligations," separately indexed.) Edited by J. E. Hand. George Allen, London. 474 pp.—[EDITOR.]

METHODS OF ASSESSING CORPORATIONS

TRENTON, N. J., February 20, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

In order to ascertain whether or not the valuations placed by our local Board of Assessors upon the property of the several telegraph, telephone, gas, electric and trolley companies in the public streets of our city, such as wires, poles, cables, conduits, pipes and mains, car tracks, etc., are excessive, I desire to secure as complete information as possible relative to the cost of construction of this species of property.

In all probability there are articles in your journal dealing with this subject. If so, will you not be kind enough to send me at your very earliest convenience any number or numbers of your journal in which this subject is treated, together with your bill for same; and if you can give me any information as to where I can find these subjects treated of elsewhere than in your publication, or can offer me any other suggestion, I shall be glad to hear from you.

CHAS. E. BIRD, City Counsel.

By referring to your file of the MUNICIPAL JOURNAL AND ENGINEER you will find articles upon the subject referred to in the February, April, October and November numbers for 1901. "Municipal Affairs," published by the City Club of New York, in its numbers for June, 1899, September, 1900, and June, 1901, also has valuable information upon this subject. By addressing the State Tax Commissioner of Albany, New York, and the State Department, Boston, Mass., further information may be obtained relative to the methods of assessing corporation property in these states.—[EDITOR.]

SOME OF SPRINGFIELD'S STREET SIGNS

SPRINGFIELD, Mass., Feb. 11, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I send you some photographs of the street signs used in our city. A post with the guide board and the new street signs that we recently have adopted is shown in No. 1. This is the arrangement for suburban streets. These guide boards are now being made, and will be placed at proper locations within the outlying districts. They are of wood, painted white and lettered in black, the painting being done in the best possible manner. The iron trimmings are black. Two bolts extend through this board from top to bottom to prevent its splitting. The other fixtures are attached to the post by lag screws, as indicated. The post is chestnut, 6 x 6 inches, and 12 feet long, 3 feet being set in the ground. This post is painted bronze green. The guide board is lettered on each side, so that it can be readily seen from either direction. This is much better than the common way of lettering on one side only.

The small signs (No. 1) are steel enameled. The letters are white on a blue ground and are made by the Baltimore (Md.) Enamel & Novelty Co. The lettering is on both sides of the plate.

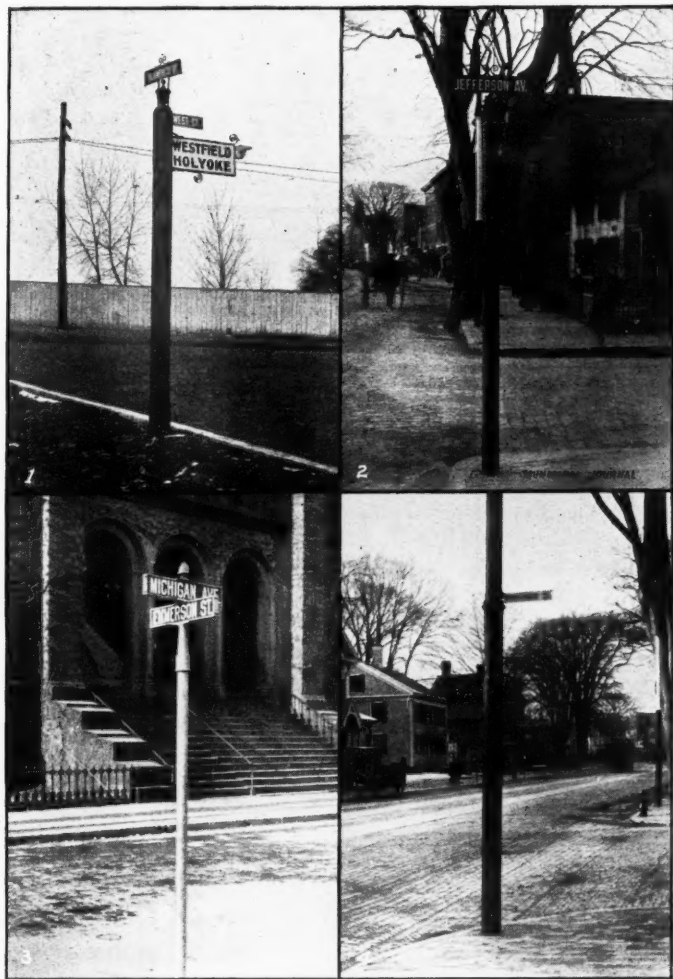
Our Board of Aldermen recently passed an order authorizing uniform street signs. This enameled sign has been chosen as the most desirable. The fixtures are our own make—(see No. 2). These are placed on wood posts, 5 x 5 inches at the base, extending 8 feet 6 inches above the walk.

One of the neatest combinations for street signs and posts is illustrated in No. 3. This is made by S. E. Norton, Chicago. The name plates are blue enameled steel, with white enameled letters on one side of the plate, requiring two plates for each street name. The fixture and post are galvanized iron. This post is set in a concrete base, making it very firm.

When the care of street signs was first detailed to me, the supervisors of streets purchased several hundred iron signs (see No. 4), made by the New Haven Street Sign Co., New Haven, Conn. These signs are attached to trolley poles along the streets having street railways, and to wooden posts in other sections. These signs are very neat, made of galvanized iron plate, painted white and lettered

black. For a low priced sign, it is the best thing I know of, but it should be painted every three years. Taking this into consideration the more durable sign of enamel is the cheaper.

Buildings are not desirable places to put street names; these name plates being small, they are easily lost among the business signs about them. It is also desirable that street corners should not be encumbered any more than possible, and if an iron trolley pole, fire-alarm or signal post is located favorably for the displaying of the street name, we should use it rather than erect an extra post. In



NEW STREET SIGNS IN SPRINGFIELD

some locations, U. S. mail boxes are favorably located for these signs, and no other post is on the corner. Where such is the case, we have obtained permission from the post-office authorities to use these letter-box posts. No advertising matter, or sign other than the street name is allowed on street sign posts.

Street signs are indispensable, and they should be placed on every corner and considered as permanent street work. Formerly we used a board, which in a few years became dull and of little use. These were often fastened to the nearest tree or to a convenient building requiring something of an effort to find them. Street names should be in the most prominent position possible. We set the posts close to the curbing (see Nos. 2 and 3), that they may be seen from either direction, making them the most prominent object on the corner. Permanent posts, with name plates that can be read from either direction are the most desirable. Two and one-half inch galvanized iron pipe, as illustrated in No. 3, fills the bill for a sign post. It is of sufficient size to support the name plates, that is, eight or more inches at the base, and is inexpensive, yet is not in the way as a heavy cast-iron post would be. An advantage which the straight post has over one with ornaments is, that it cannot be so easily climbed by boys. At first our wooden posts were turned with "shoulders," just enough for boys to fasten to and climb the post easily. I have done away with these ornaments and now have our posts as plain as good looks will permit.

WILLIAM F. GALE, *City Forester.*

DISPENSARY PAYS TOWN EXPENSES

WEST BLOCTON, Ala., February 4, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I take pleasure in giving you the information you ask in regard to the Blocton dispensary. In the first place, whisky, beer and wine are sold in sealed packages varying from one-half pint to one gallon of whisky and wine to from one pint to eight gallons of beer. They are sold from six o'clock in the morning to six at night, for cash only, and no drinking is allowed on the premises. All grades of whisky are sold.

The business is under the supervision of five commissioners, who are citizens of the town, named by the act of the legislature that chartered the institution. The terms extend from one to five years in rotation, one retiring each year. His successor is chosen by the mayor and councilmen of West Blocton. This method gives a permanent management. The county supervisors choose a manager, who is in charge of the sales of the dispensary. He is under bond and has assistants, etc.

The net profits are divided equally between the town of West Blocton and the county of Bibb. The county's share is divided equally between the county road and school funds. The town's portion is used for public improvements, the government and the schools. Since the opening of the dispensary on May 24th, 1901, up to January 1st, 1902, the net total profits has been \$9,040, or an annual revenue of \$15,000.

The town is now beginning the installation of a system of water works, which will be built without any taxation, and will be practically free to patrons within the town's limits.

The dispensary system is becoming very popular in this state for several reasons: First, social tipping is avoided and drunkenness is lessened; second, the revenues go to the public at large.

E. D. REYNOLDS, *Mayor.*

The above letter was received from Mayor Reynolds in response to a request for information about this dispensary. The town of West Blocton is a small incorporated town of 375 inhabitants and is contiguous to the coal mining camp of Blocton of 2,500 inhabitants, but unincorporated.—[EDITOR.]

PERSONALITIES

—Mr. T. J. Moreland is the new City Engineer of Knoxville, Tenn.

—Mr. Louis J. Kelsey, City Engineer of Salt Lake City, Utah, has resigned.

—Mr. A. J. Reily has received the appointment as City Engineer of Ensley, Ala.

—Mr. James McCabe has resigned his position of City Engineer of Topeka, Kan.

—City Clerk J. P. Groesch, of Dunkirk, N. Y., writes that Mr. J. P. Morrissey has been reappointed City Civil Engineer for 1902.

—Hon. Thomas S. Fry, Mayor of Mobile, Ala., died on February 6th last. He had been a resident of the city for over forty years.

—Mrs. William Bair, of Vicksburg, Miss., has presented a library to the town to be under the charge of the Ladies' Library Association.

—Mr. Richard A. Jones has been appointed superintendent of streets of Waltham, Mass., and Mr. Samuel Patch superintendent of public buildings of the same city.

—North Adams, Mass., has a new Superintendent of Streets in the person of George F. Owens, and a new Superintendent of Water Works in Mr. William F. Hodge.

—Hon. Hiram P. Gahan, of Eau Claire, Wis., died on January 24th at the age of 82 years. He served as the first mayor of the city and was president of the Phoenix Manufacturing Company.

—Mayor Cunningham, of Bay City, Mich., has taken one of the leading roles in a play given for the benefit of the Police Fund Association. All reports have it that His Honor will make a "star," if he keeps at it long enough.

—Inasmuch as the aldermen would not confirm the appointment of Mayor John F. Hurley, of Salem, Mass., for Chief of Police, the Mayor immediately removed the old Chief and announced that he would himself look after the force.

—By a ruling of the last legislature of Indiana, Mr. George E. Mahin has the honor of holding the positions of City Clerk and Mayor of Newcastle, Ind. Mr. Mahin was councilman and lately unanimously elected City Clerk by the Council.

—The Society for the Beautifying of Buffalo has asked Mr. Charles Mulford Robinson, of Rochester, N. Y., to visit that city and make a report to the Society on the needs of the city in the line of improvements to which the Society is devoting its time.

—Mayor Grainger, of Louisville, Ky., has gone into the coal business and is distributing bushels of coal to the needy. The Council authorized him to purchase 25,000 bushels for this purpose and, as this was soon exhausted, 10,000 bushels more were contracted for.

—Mayor Schmitz, of San Francisco, Cal., had no authority to remove County Clerk Albert B. Mahony, according to a decision recently delivered by Judge Hebbard of the Superior Court. The judge decided that the municipal officers have no jurisdiction over county officials.

—Mr. John Brunner, Mem. Amer. Soc. C. E., Superintendent of Bureau of Engineering and Construction, Department of Public Works, Pittsburg, Pa., has resigned to accept the position of Assistant General Superintendent of the structural department of the Illinois Steel Company, Chicago.

—The recent election in Montreal, Canada, resulted in the selection of Mr. James Cochrane as mayor. While a native of Scotland, Mr. Cochrane started business in Montreal at an early age and later became a contractor for asphalt paving. Mr. Cochrane heads the reform party which is now returned to power.

—Mayor Tom L. Johnson, of Cleveland, O., has been defeated in his mandamus suit compelling the State Board of Equalization for Railways to raise the taxes of the various roads within the State. The State Board had declared that, inasmuch as the County Auditors had refused to change the assessments, it had no authority to raise the taxes.

—Hon. Charles Parker died at his home in Meriden, Conn., on the last day of January at the age of ninety-three. Mr. Parker was the first mayor that Meriden had and had been the principal in many well known manufacturing companies such as Parker Bros., makers of the famous Parker guns, the Meriden Curtain Fixture Company, etc.

—Mrs. Mary A. Ryle, of Paterson, N. J., has offered the trustees of the Free Public Library \$100,000 towards rebuilding the library recently destroyed by fire. It was Mrs. Ryle who, in 1889, gave the Danforth homestead, built by her father, to the city for use as a library, subsequently donating \$25,000 to aid in fitting it up. It was this building that was destroyed.

—Mayor Robert J. Black, of McKeesport, Pa., recently vetoed a resolution granting the W. Dewees Wood Company of the American Sheet Steel Company the right to lay a narrow gauge electric road on one of the streets. The Council almost unanimously voted against the veto, showing that it is not in sympathy with the Mayor's endeavor to drive all the mills out of the town.

—The President of the American Society of Municipal Improvements, Mr. Edwin A. Fisher, City Engineer of Rochester, N. Y., has appointed the following Committee on Municipal Franchises: Robert E. McMath, St. Louis, Mo.; William S. Crandall, Editor of the

MUNICIPAL JOURNAL AND ENGINEER, New York, and D. L. Fulton, Superintendent of Public Works, Alleghany, Pa.

—Because Mayor Combe, of St. Joseph, Mo., was absent from the city for two weeks on private business, City Auditor Lucas divided the \$200 that is the monthly salary of His Honor and gave half of it to President Jamieson of the Council, who acted as mayor during Mr. Combe's absence. This is not the first time that the Mayor has been off on private business, but it is the first that any exception has been taken to his action.

—Hon. William Glasmann, Mayor of Ogden, Utah, was fined \$10 for violating the health department's regulations. The Mayor visited the pest house, talked with one of the small-pox patients and then went about the city without having taken the pains to disinfect his clothes. His arrest caused quite a sensation in Ogden and, while the case had its comic side, the Mayor's action could not fail to meet with the condemnation of all thinking citizens.

—Mr. J. Richard Freud, secretary and attorney of the Merchants' Association of San Francisco, Cal., died on January 6th. He was a graduate of the University of California. He started a free library for laboring men and this was afterwards merged into the Free Public Library of San Francisco. At the age of twenty-one he was elected a member of the Constitutional Convention which framed the present State Constitution. He was one of the charter members of the Merchants' Association and has held a position as a Civil Service Commissioner.

—In the following Pennsylvania cities mayors have been elected: York, Mr. M. B. Gibson, Republican; Franklin, Dr. S. G. Foster, Republican; Bradford, Mr. George H. Potter, Democrat; Titusville, Mr. D. F. Reuting, Republican; Chester, Mr. Howard H. Houston, Republican; Reading, Mr. Edward Yeager, Democrat; Carbondale, Mr. J. J. O'Neil, Democrat; Oil City, Capt. James Hasson, Democrat; Johnstown, Mr. John Pendry, Republican; Lancaster, Mr. Chester W. Cummings, Republican; New Castle, John C. Jackson, Republican; Harrisburg, Mr. Vance C. McCormick, Democrat; Allentown, Hon. Fred E. Lewis, Republican; Williamsport, Mr. John F. Laedlein, Democrat; Easton, Mr. Horace Lehr, Democrat.

—Ex-Mayor James D. Phelan, of San Francisco, was in town last month and spent rather an unpleasant quarter of an hour with Wu Ting-fang, Chinese Minister to Washington, in the corridor of the Waldorf-Astoria. Mr. Phelan visited the East as one of the commissioners appointed by the Governor of California to represent the State before the committees of the Senate and House that are now considering the bill which proposes to renew the Chinese Exclusion Act. It was on his return from Washington to San Francisco, via New York, that he encountered Mr. Wu. The two were introduced by a mutual friend, when Mr. Wu, in his rage, forgot his diplomacy and denounced the Californian on the instant as an enemy to Chinamen. He said: "You are the enemy of our country and you are trying to keep the Chinese out of the United States." Mr. Phelan, in a dignified but emphatic manner replied: "We must protect our own. We must maintain our majorities." "Majorities!" shouted Wu. "I know what you mean, Mr. Phelan, you want to be elected again!" "Oh, no; I don't!" Mr. Phelan said. "Five times as mayor are enough for me." Then he mentioned the hated word "coolie." "They are not like our race. They live in filthy houses and work so cheaply that our laborers cannot compete with them." "Then we'll keep the American out of China!" retorted Wu. "Yes, we'll keep you out of China! We can get along without you. What have you got that we must have?" "We have western civilization," said Mr. Phelan. "We can get western civilization from Europe," was the rejoinder. And so the incident closed with the verdict in Mr. Phelan's favor.



CURRENT NEWS AND PRACTICE AMONG THE CITIES

Wooden Slats for Sidewalks—Burnt Clay for Roads—Smoke Ordinance Enforced—City Cleans Snow from Walks—City Furniture Plant New Way to Pay Taxes

CITY FURNITURE PLANT.—The Board of Public Works of Milwaukee, Wis., has been asked to have all the furniture for the public schools made in the city work shops. Heretofore the city had been in the habit of manufacturing seats for the schools, and it intended to go back to this custom. An appropriation of \$2,000 will be asked from the Council to secure school furniture without the intervention of contract.

OFFICIALS MUST PAY DEBTS.—The City Council of Pratt City, Ala., has passed a resolution forbidding any man from holding a city office who does not settle his debts promptly. The city will not be responsible for the debts hereafter. All city officials and employees are included in the prohibition. The question arose as to the qualifications of one of the policemen recently elected and a committee was appointed to look into the matter.

CITY CLEANS SNOW FROM SIDEWALKS.—The street cleaning department of New York has introduced a new rule in the manner of handling the snow. The sweepers clean the sidewalks as well as the streets. It has been found by experience that it is useless to try to thoroughly clean the streets until the sidewalks have been cleaned, for, otherwise, the snow on the walks is shoveled on to the street and the streets must be cleaned twice. On the asphalted streets snow scrapers have been used with success.

WATER SUPPLY SHUT OFF.—Owing to ice obstructing the intake pipe of the water works, the entire supply of water for the city of Dunkirk, N. Y., was recently shut off and the people were in great tribulation. All the snow that could be collected was melted, but the supply of this was limited. All the factories had to shut down and much distress was experienced. For the third time in three weeks ice shut off the water supply of Evanston, Ill. Many men had to go to Chicago for their meals. The local heating company pumped the mains dry so that not an ounce of water could be obtained for use.

PURE WATER FOR MINNEAPOLIS.—City Engineer Sublette of Minneapolis, Minn., recently read a paper on the needs of his city for a pure water supply. He said that the water from the Mississippi must be used, but the methods of filtration must be determined. The rapid mechanical method of filtration is recommended by Mr. Sublette as the best. The ideal method of treating the water supply would be the construction of a dam on the river, to carry the water to sedimentation beds on low ground, and after settling to be carried by conduit to the suction wells of the high service station. The mechanical filtration could be added to these methods when necessary.

TO ABOLISH MARRIAGE BUREAU.—Borough President Cantor of New York has announced that he will do away with the "Marriage Bureau," a private speculation conducted in the basement of the City Hall in the interest of the aldermen. This "bureau" has been responsible for much of the crime in the city and the Borough President will try to have the ordinance repealed. Many young girls have been married by the aldermen to the notorious "cadets" through this means and the aldermen receive from \$5 to \$15 for each ceremony. President Cantor has been largely commended and especially from societies for prevention of crime.

BURNT CLAY FOR ROADS.—At the meeting of the Wisconsin clay workers held at Milwaukee in January, Mr. G. H. Stanchfield, city engineer of Watertown, called the attention of the members to the article of Charles K. Keyes, in the *Review of Reviews* on the

use of burnt clay for roads. He said that it should be more widely known that the clay which is such a detriment to a good road can, by burning, be made of great service on highways when gravel and stone is not to be had. Burnt clay roads are hard and dry in the wettest weather and do not cost any more than the ordinary country dirt road.

NEW WAY TO PAY TAXES.—In Seattle, Wash., it is proposed that a new plan be adopted by which special improvements can be carried on and the city be in no danger of losing the money for the work. The entire amount will be ordered paid on a fixed date, soon after the completion of the work. If before this date a property holder files with the city treasurer, tax certificates showing that there are no taxes due on his property and at the same time pays one-tenth of the amount of the assessment due, with the interest on the rest, for the next twelve months, he will be allowed to postpone payment of the remainder for a year. If at the end of this year he again shows that no taxes are due such that the property could be seized by law, another postponement of the payment will be allowed, but one-tenth of the full amount will have to be paid as well as the interest on the remainder for the next year. This process can be carried on for the full ten years. If the property holder fails to show the said tax certificates, the whole amount will then be due the city and collectable at once.

VIOLATED SMOKE ORDINANCE.—The Washington Traction and Electric Company, in the capital city, has been fined \$300 on twelve charges for violation of the law against allowing smoke to issue from its power house. The company has been in court four times on similar charges, but each time asked leniency on the ground that it was doing everything possible to prevent the nuisance. Nothing could be done by the court, however, but to impose the fine of \$25 on each complaint. Collateral was put up by the company to enable it to try some means of preventing the smoke, but as this seemingly could not be done, the court declared the bond forfeited. The managers of two buildings and of an ice company were also arrested on complaint of the health department for allowing black smoke to issue from the chimneys of their buildings.

WOODEN SLATS FOR CITY WALKS.—The citizens of Milwaukee, Wis., have been using wooden slats to cover their walks so that, in snowy weather, when the walks are covered with ice, persons will be able to walk on the streets without danger of slipping. Strips of small boards about the size of laths are strung on pieces of malleable iron which makes it possible to roll them up like a rug. When one side of these strips becomes icy, they can be readily reversed in a few minutes and a clean side presented. The iron strips keep the wood from touching the walk and it takes much longer to coat them with ice than an ordinary board walk. Inasmuch as the city is liable for damages if any one falls on an icy pavement, the authorities have made no objection to using the slats. The idea has taken in the city and there are miles of these coverings to the walks.

WHERE MUNICIPAL OWNERSHIP PAYS.—The city of Mishawaka, Ind., has a population of but 6,000, but its municipal lighting plant has been a success in every way. The plant was built in 1895 by a company of citizens whose object was to turn it over to the city when finished. This was done in 1896, \$23,000 in bonds being issued. The revenue derived from commercial lighting pays the running expenses. There is a levy of 15 cents on the \$100 and this is applied on the original indebtedness. The rate charged for commercial lighting is only 11 cents per kilowatt, with a discount of 20 per

cent. for cash. The plant is now worth \$35,000, but the bonded indebtedness has been reduced to \$12,000. The last report of the superintendent shows that the running expenses amounted to \$12,851.58 and the receipts were \$1,094.14. The balance will be applied on the payment of the bonds. The small balance is explained by the fact that in the running expenses is included the money applied on building and equipment.

WASTAGE OF WATER.—It is a practice of many people, during the cold weather, to allow the water to run in their pipes continually so as to prevent them from freezing. The result of this is that there is an enormous waste of water. During a recent cold snap in Jersey City, N. J., the waste of water by this means amounted to about 4,000,000 gallons a day as calculated by the water department. Chief Engineer Van Keuren has recommended that the property owners be compelled to put in proper plumbing whereby the pipes cannot freeze, or that meters be installed. In Kansas City, Mo., the water is shut off from all houses where the occupants allow the water to run all the time, and a fine is also imposed. In this city there is no need for the people to let the water run as every house is furnished with a stop and waste valve in the cellar, by turning which the water is drained from the pipes and the danger of freezing averted. Columbus, O., officials have also issued orders that the water shall be shut off from houses where it is allowed to run to waste.

FRANCHISES NOT TAXABLE.—The Court of Errors and Appeals of New Jersey has reversed the judgment of the Supreme Court, which sustained the city of Newark in taxing as real estate the right of the North Jersey Street Railway Company to the use of the public streets. The Court recognizes the fact that the franchise is property and as such taxable, but under the present legislation the right to tax has been reserved by the State to itself and not delegated to the several municipalities through which the road may pass. The Supreme Court had held that the company had a partial ownership in the soil and this was assessable as real estate, but the higher court denies any such ownership. Trenton has been taxing the corporations within her limits and this decision will cause an annual loss to the city of \$13,000. In New York State there has been no recent decision in the matter of the Special Franchise Tax Law. The large corporations in New York City had begun certiorari proceedings before a referee and the referee has not yet reached a decision in the matter.

TAX ON VEHICLES.—The old vehicle tax will be revived in Galveston, Tex., and every vehicle in the town will have to have a tag on it showing that the license has been paid. The ordinance provides that every dray, furniture cart, grocery wagon, delivery wagon drawn by not more than one animal, shall pay an annual tax of \$5 and cost of numbering, not to exceed 25 cents. Every milk and butcher wagon or other vehicle used for such purposes drawn by not more than one animal shall pay an annual tax of \$2.50 and cost of numbering, not to exceed 25 cents. Every truck or float drawn by two animals, \$12 and cost of numbering, not to exceed 25 cents. All other four-wheel vehicles drawn by not over two animals, \$8 and cost of numbering, not to exceed 25 cents. An additional tax of \$1 will be levied on each additional animal used by any of the foregoing vehicles. Every hack, omnibus and street car shall pay an annual tax of \$8 and the cost of numbering; every buggy kept for hire shall pay \$5 and the cost of numbering; every buggy, buckboard and other vehicle, not especially mentioned shall pay \$2.50 and the cost of numbering. The revenue from this tax is to go for the improvement of the streets and avenues, and it is estimated that between \$2,500 and \$3,000 will be collected during the year.

MONTREAL'S BUILDING DEPARTMENT.—To have entire charge of the buildings of a large city like Montreal, Canada, and to assist other city departments in their work, requires a man of ability out of the ordinary to say the least. Mr. Alcide Chaussé has been at the head of the Building Department of the city of Montreal since the spring of 1899 and since then the work in his department

has been carried out in the best manner possible. His report for the past year gives a little insight as to the amount of work that is done under him. All permits for new buildings, for additions and alterations to old ones, inspection of all buildings, including schools, churches, theatres, yards, erection of steam boilers, inspection of fire escapes, combustibles, elevators, sands, fire-works, etc., are some of the things done by Mr. Chaussé and his assistants. In addition, aid is afforded other departments. Thus the examinations of master plumbers, inspection of repairs to fire stations, inspections of parks and ferries, etc., is undertaken by the Building Department. During the year 1901, there were 443 new buildings erected, valued at \$2,568,378, and \$332,361 worth of alterations. This was the largest number of new buildings erected in ten years. Mr. Chaussé is an active member of the Chamber of Commerce, a Commissioner of the Superior Court and a member of a dozen organizations such as the Quebec Association of Architects and the American Society of Municipal Improvements.

STREET AND HIGHWAY ASSOCIATION.—There is an active association at work in New Jersey which has for its chief object the betterment of streets and highways. It is known as the Street and Highway Association of the State of New Jersey. Its membership is made up of the executive officers, and their assistants, of the street departments of the different cities of New Jersey. It holds regular meetings on the third Wednesday of each month. The expenses of the association are limited to the postage and stationery used by the Secretary, which is met by an assessment upon each member, the amount being limited to \$1.00 per annum. There is an arrangement, however, in order to promote the social intercourse of the members, to have a luncheon or dinner provided by the executive committee after each monthly meeting, for which each member is assessed the sum of \$1.00. Those members who are not present and who notify the secretary three days in advance of the meeting of their intended absence, are not obliged to pay for the dinner. Every subject pertaining to the construction, cleaning, sprinkling and maintenance of streets is open for discussion at the monthly meetings although the general practice is to confine the discussion to some one subject. The last meeting was held at Trenton, N. J., on February 19th, when it was thought advisable to prepare a bill to present to the legislature, compelling all municipalities to provide a per capita tax for street cleaning in towns and cities. This association has had much to do with securing the passage of legislation favoring the use of broad tires under certain conditions.

SYRACUSE MUNICIPAL LODGING HOUSE.—The sentiment in favor of municipal lodging houses has been growing steadily in the United States and the day will come when they will be as plentiful as in England. In many of the largest cities in this country such institutions have been established, but in Syracuse, N. Y., the sentiment as to their efficiency is divided. In his report to the Mayor and Common Council of the city of Syracuse, Mr. John Hazeltine, Superintendent of the Municipal Lodging House, states that the expenses for the year 1901 amounted to \$5,532.55. The appropriation for the year was \$5,547.50, leaving a balance of \$14.95. The county paid \$550.75 for the non-residents, furnished meals and lodging, and it still owed \$222.30. During the year there were 6,351 night lodgers and the number of persons who worked for a meal alone was 695. All these worked on the streets and other places 26,099 hours which, at the regular pay for eight hours a day, would amount to \$4,893.07 that the lodgers earned for the city. With the amount received from the county, the total earnings of the Municipal Lodging House amounts to \$119.38 more than the expenses. The lodgers have been put to work on back streets, alleys, etc., and at any work which the city laborers did not need. During the year 1,138 persons were placed in positions. Mr. Hazeltine in addition to his duties as Superintendent of the Lodging House, served also as pound master, looking after all untagged dogs in the city. Many charitable people sent clothing and groceries to be distributed to the poor and 138 families received coal and other supplies from Mr. Hazeltine. Throughout the year there had been no disturbances in the Lodging House nor had the police visited it for the purpose of finding a criminal or disorderly person.

SIGNS AND STREET NUMBERING SYSTEM IN WASHINGTON

Mr. SNOWDEN ASHFORD, Inspector of Buildings of Washington, D. C., has made a report on the system employed in numbering houses and streets in the District. He said:

"As the streets of the city run east and west and north and south, cardinal lines are taken through the Capitol Building corresponding with East, West, North, and South Capitol streets, dividing the city into four sections.

"Turning from the Capitol to number any particular street, beginning with No. 1 on the first square from the Capitol on the right hand side of the street and No. 2 on the left hand side of the same street, and running thus with successive numbers to the next intersecting street, where the numbers begin 100 on the left hand side and 101 on the right hand side of the street. The numbering proceeds in this order, beginning with succeeding hundreds at each successive square and numbering in the same manner to the end of the street.

"It will be seen by this system that the first number on the square

would indicate the location of the square and the building with reference to the Capitol. This system is extended beyond the city limits, where streets are laid out in conformity with the city streets."

The cost of the numbering is paid by the owners and there is no regulation defining the size or style of the numbers.

Mr. Thomas J. Fisher, of the Electrical Department, reporting on the style and cost of street signs, said that there are at present three styles in use. Those on gas or naphtha lamps of double thick ruby glass with the lettering in white. These cost 22 cents each. The signs on corners where there are arc lights are brass-bound, japanned tin and the lettering gilt. The tins cost 12 cents and the lettering 25 cents. The special signs in use on ornamental Collis lamps are of double thick ground glass, with red letters, and cost 50 cents. The style of lettering is plain and the signs for gas lamps are placed in square copper frames with scroll work at the top and bottom.

BOSTON'S EXPENSIVE GOVERNMENT

The city of Boston has been awakened to the fact that its municipal government is the most expensive of any city in the country.

When the Hon. P. A. Collins was elected to the mayoralty last December, he employed Mr. Harvey S. Chase, an expert accountant, to investigate the financial conditions of the different city departments. The investigation included the last year's work and Mr. Chase's report on the subject is of interest to others outside of that New England city. While Mr. Chase has not completed his full report, he has, in a preliminary statement, submitted some general conclusions.

Considering expenditures from a per capita standpoint, Boston's exceed those of New York.

Mr. Chase has compiled some valuable tables, which are given below, showing how Boston compares with New York and the average of ten cities. These cities are Chicago, Philadelphia, St. Louis, Baltimore, Cleveland, Buffalo, Milwaukee, Providence, Indianapolis and Kansas City. The large expenditures of Boston gives rise to the question as to what departments are spending too much. As seen below schools cause the heaviest outlay and police the next largest.

PER CAPITA EXPENSE FOR OPERATION AND MAINTENANCE.*

	Boston	New York	Average of 10 cities
Schools	\$5.31	\$4.74	\$3.04
Interest .....	.381	4.15	1.54
Police	2.98	3.25	2.03
Streets	2.51	.58	.40
Water	2.23	1.02	.85
Hospitals, etc.	2.12	1.47	.31
Fire	2.15	1.48	1.08
Lighting	1.30	.77	.73
Garbage	1.09	.33	.33
Street cleaning and watering.....	.92	1.30	.37
Ferries and bridges.....	.70	.12	.10
Sewers .....	.64	.23	.14
Library .....	.55	.18	.14
Parks and Gardens.....	.54	.54	.36
Health, etc. ....	.53	.33	.18
All other	6.69	11.13	2.30
Totals.....	\$34.07	\$31.62	\$13.90

TOTAL EXPENDITURES PER CAPITA.†

	Boston	New York	Average of 10 cities
Interest and sinking funds.....	\$8.24	\$4.30	\$2.20
Streets	7.21	2.52	1.48
Schools	7.05	6.24	3.64
Police and (courts, etc.).....	5.27	3.57	2.31
Sewers	3.00	.42	.58
Water Works.....	2.96	2.20	1.48
Hospitals, etc.	2.30	1.54	.33
Fire	2.20	1.58	1.14
Parks and Gardens.....	1.43	1.27	.57
Ferries and Bridges.....	1.36	.30	.17
Municipal Lighting	1.30	.77	.73

* Excluding permanent construction.

† Including permanent construction.

Garbage Removal	1.09	.33	.33
Street cleaning and watering.....	.92	1.30	.37
Libraries, museums, etc.....	.55	.54	.17
Health, baths, cemeteries and markets .....	.54	.35	.18
All other	4.41	14.81	2.62
Total.....	\$49.98	\$42.04	\$18.30

PER CAPITA OPERATION AND MAINTENANCE.

	1892-3	1894-5	1897-8	1900-1
Population	468,000	487,000	523,000	561,000
Schools	\$4.25	\$4.31	\$4.75	\$5.31
Interest on debt.....	3.61	3.00	3.73	3.81
Police	2.44	2.70	3.21	2.98
Water Works	2.89	2.95	2.90	3.27
Fire Department	2.11	2.14	2.45	2.15
Hospitals	1.80	1.84	1.88	2.12
Municipal Lighting.....	1.24	1.18	1.19	1.30
Garbage Removal	1.00	.96	.94	1.09
Street cleaning & sprinkling .....	.81	.81	.89	.92
Parks and Gardens .....	.40	.43	.43	.53
Ferries and Bridges.....	.75	.73	.69	.70
Sewers .....	.98	.62	.57	.64
Libraries .....	.36	.36	.50	.55
Health, Baths, Markets and cemeteries .....	.41	.44	.44	.53
All other (except streets)....	5.42	5.60	6.24	5.86
Total	\$28.47	\$28.07	\$30.84	\$31.76

Total street expenditures (including construction)...	\$5.45	\$4.70	\$8.78	\$9.93
	\$33.92	\$32.77	\$39.62	\$41.69

Schools, net expense per scholar	\$28.32	\$28.00	\$29.91	\$32.96
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RUNNING EXPENSES PER CAPITA OF TWELVE CITIES.

	Running Expenses (excluding interest) per capita	Relative Standing taking Boston at 100
Boston	\$30.26	100
New York	24.47	91
Average of following 10 cities	12.36	41
Providence	16.86	56
Buffalo	15.11	50
St. Louis	14.28	47
Philadelphia	13.93	46
Baltimore	12.29	41
Milwaukee	11.08	37
Chicago	10.72	35
Cleveland	10.40	34
Kansas City	10.23	34
Indianapolis	9.08	30

BOSTON'S INCREASE IN VALUE AND POPULATION.

	City of Boston Valuations of property in Boston, May 1.	Population.	Valuation per capita.
1892	\$893,975,704	468,000	1,910
1894	928,109,704	487,000	1,906
1897	1,012,582,209	523,000	1,936
1900	1,129,175,832	561,000	2,013
Increase of valuation per capita from 1892 to 1900 about 5 1/4 per cent.			

ANNUAL MEETING OF BRICK MAKERS

THE sixteenth annual convention of the National Brick Manufacturers' Association, held in Cleveland from February 10 to 15, was by far the most successful and most largely attended gathering of that body in its history. Nearly all the States in the Union were represented, delegates attending from the far west and the far east, as well as many southern states. The programme was so arranged as to afford great pleasure to the visitors, as well as opportunities for exchanging business ideas.

The annual banquet held Wednesday evening, February 12, at the Hollenden Hotel, was a delightful affair. Retiring President Wm. H. Hunt, of the association, acted as toastmaster, and the programme of after-dinner speeches was participated in by Mr. H. R. Cooley, who spoke for the city of Cleveland; Mr. S. H. Holding, representing the Chamber of Commerce Building; Mr. Arthur Bradley, representing the Builders' Exchange; Rev. C. W. Hiatt, Geo. M. Fiske, of Boston; W. D. Gates, of Chicago; Jno. W. Sibley, of Birmingham, Ala., and others.

Thursday morning was devoted to an excursion to the yards of the Cleveland Hydraulic Press Brick Company, by whose courtesy a special train was furnished. Three hundred and fifty delegates, filling six coaches, carefully inspected the details of this plant, of

which ex-President Hunt of the association is the general manager, and whose product the "Akron" impervious red press brick, has a national reputation. Luncheon was served at the yard and on the return trip, visits were paid to other brick plants, a decidedly business trend being given to the morning.

The ladies were entertained on Thursday morning, with a trolley ride and luncheon at the Colonial Club. Thursday evening a theatre party was given at the Empire, in which the members of the Builders' Exchange joined.

At the sessions of the convention many papers of interest to brick-makers were read and discussed with profit to delegates. Retiring President William H. Hunt, of Cleveland, delivered his annual address, in which many suggestions were made for improvement in business methods among those connected with the clay-working industry.

The officers elected for the ensuing year were as follows: Mr. Geo. M. Fiske, Boston, president; Mr. T. A. Randall, of Indianapolis, secretary for the sixteenth term; Mr. Jno. W. Sibley, of Birmingham, Ala., treasurer; and vice-presidents, Mr. Clifford Chase, of Milwaukee, first; Mr. H. C. Bradley, of Cleveland, second; Mr. John Miller, of Washington, D. C., third.

TWENTY MILLION DOLLARS FOR GOOD ROADS IN THE EMPIRE STATE

THE Highway Commissioners of the State of New York met in their third annual convention at Albany the latter part of January and approved several propositions which are to be submitted to the State Legislature during the present session. First, it was proposed that the state appropriate \$1,000,000 from state funds for the improvement of its public highways this year; second, that \$20,000,000 be expended during the next ten years for the improvement of the public highways under the direction of State Engineer Bond.

This proposition, as originally presented by Mr. Bond, called for \$10,000,000 only, but when the matter was considered by the members of the convention—about 150 in number, of whom a majority were farmers—the amount to be thus expended was doubled. The suggestion of Mr. Bond was emphatically approved by the members of the convention. It is proposed that, in carrying out this plan, the State issue bonds to the amount of \$20,000,000, bearing 3 per cent. interest and payable in seventeen years, with the provision for annual payment by the state and counties to a sinking fund sufficient to meet both principal and interest within the prescribed time. The State Engineer said that this expenditure would construct upward of twenty-five hundred miles of improved Macadam road. The policy of the New York State road builders calls for the construction of the best road that is built in the country, the average cost per mile being about \$5,000. While New Jersey, Connecticut and Massachusetts have been leaders in highway improvement for a longer period than the Empire State, the latter is the first to take the ground that a more permanent form of road should be constructed. The other states mentioned have been in the habit of building roads which have cost, as a rule, not to exceed \$2,000 per mile. This has been the practice also in several western and southern states. The roads which New York State will build, under this proposition, are not to be compared for a moment with the very loose and imperfect roads which are constructed under the direction of the Good Roads Trains which have recently made trips through the Middle West and South. The roads in New York will be developed under the terms of the Higbie-Armstrong Act, and will be under the direct supervision of State Engineer Bond. The thoroughness which has characterised all the improvements which have been made under this act, is a sufficient evidence that the moneys of the state will be judiciously expended in the present administration of the State Engineering Department.

If this scheme is adopted by the Legislature, according to figures prepared by Mr. Bond, the State tax would be less than six cents on one thousand dollars' valuation, and if the money is spent in the various counties in proportion to their assessed valuation, it would amount to seventeen cents on each one thousand dollars' valuation

for the county tax, making the total tax, State and county, twenty-three cents on one thousand dollars; that is, if the tax was levied on this basis, in seventeen years both principal and interest on the bonds would be paid. This proposition was indorsed by the convention at Albany with only one dissenting vote. Under the legislative act which provides for this expenditure, 50 per cent., or \$10,000,000 of the bonds would be paid or assumed by the state, while the counties in which the work was performed would meet 35 per cent. and the town 15 per cent. of the sum necessary for the road improvement. Any county has the right to decline to have any of its roads improved, as well as any township, so that, so far as the expense to the county and town is concerned, it can be avoided if they so elect, but the State tax will become a burden upon the several counties whether they have any of their roads improved or not. The cities represented at this convention, which included New York, Albany, Troy, Utica, Syracuse, Rochester, Buffalo and many of smaller population, were unanimously in favor of the proposition. As it was shown that 93 per cent. of the State taxes are paid annually by the cities of New York State, it will be readily understood that the rural districts will not be seriously burdened for the improvement of their roads, although they will receive a larger material benefit than the cities.

Since the inauguration of this road improvement scheme in 1898, by State Engineer Bond, 59½ miles of improved road have been completed, and 109½ are now under construction. The plan has become so popular among the counties of the state that during the last year petitions have come from the various county supervisors asking for highway improvements in their respective counties to the amount of \$960,416.50, which would call for a total expenditure by state, county and town of \$1,920,833. Although the highway commissioners in this commission voted unanimously for an appropriation of \$1,000,000 for this year, and although the governor signified his willingness to acquiesce in the request of the convention, the legislature has seen fit to set aside only \$600,000 for the work for the coming season. This means that less than one-third of the roads already asked for can be built. There are 231,434 miles of road within the limits of New York State which are to be improved, of which the improvement, up to January 1, 1902, of 1,308 miles had been petitioned for. The scheme which State Engineer Bond presents is feasible and will require the hearty support of state, county and township. A part of his plan is to have county-seat connecting roads throughout the state, which will provide, when completed, a system of through thoroughfares leading in all directions throughout the state, and will provide for an ideal system of highways as compared with those of other states.

THE COPENHAGEN FIRE DEPARTMENT

The "Fire Laddie" Princess—Not Connected with Army, as Elsewhere in Europe—Old Fire Alarm Telegraph a Failure, Contemplate Introducing the Gamewell—Good Water Supply—Splendid Lot of Firemen

By Our Special Correspondent

To have a royal princess as a patron is an honor that is not conferred upon many fire departments in Europe. The firemen of Copenhagen, Denmark, however, are thus honored and are very proud of their "Fire-laddie Princess." Princess Marie is a member of the old House of Orleans and the wife of Prince Waldemar, son of the King of Denmark. Her interest in the department is more than cursory and it is this fact that makes her dear to the Danish firemen.

While the connection of the Princess with the department makes it known throughout the Continent, in itself the fire department of Copenhagen is one of which the city need not be ashamed. The courage of the firemen supplement their thorough training and the methods and organization of the whole department are of the best.



LOUNGING ROOM OF FIREMEN

The city has a population of 375,251, to guard which from fire a force of seven officers, twenty-six subordinate officers, six machinists, 163 privates and thirty-three drivers is required. Compared with the forces in American cities for places of the same or approximate size the force is a small one.

Copenhagen is another city in Europe where the army is not identified with the fire department. The chief, Colonel Mayer, who is very popular, was a military man, but he is the only one on the

force connected with the army. The others are enlisted men and the privates are mainly sailors, masons and other artisans. The hours of service are forty-eight on and twenty-four off duty so that the men have a rest every third day. Besides the headquarters there are three stations of large size and two watch houses. Each of the stations has a steam fire engine and tender and one mechanical ladder. There are also one engine and one ladder held in reserve. Twelve manual trucks and other usual fire apparatus completes the department's working material.

As in all up-to-date fire departments the telegraph plays an important part. The stations are connected by means of underground wires and all receive the alarms at the same time. The city is divided into districts and the engines are sent out from the two stations nearest to the place of the fire. In the city there are fifty-nine street alarm boxes and seventy-three alarms in buildings. All the street alarms are not of the same pattern, although the old style of the German alarm is being supplemented by the new. In the old the person giving an alarm must break a piece of glass and press a button, but the new boxes have a crank to turn. A bell rings whenever the crank is turned so that a person cannot send an alarm without notifying the police officer on the beat. This is a deterrent from sending in false alarms. The well-known Gamewell system has been considered by the authorities, but nothing has yet been done, notwithstanding the fact that they were convinced of its superior qualities. As in New York and other American cities the telephone is connected with headquarters so that an alarm can be sent in from

any 'phone in the city. Automatic telephones are placed in many doorways in the city, making it very easy to notify headquarters of a fire.

The water supply of Copenhagen, from the firemen's standpoint at least, is excellent. The mains have a pressure of a head of 150 feet and about every 220 feet along the streets is a hydrant, 1,500 in all. The number of hydrants, however, is small as compared with American cities, but the latter places are spread over a greater area, and a greater number of hydrants is necessary.

The training of the men has been done well, for it takes but a few seconds to get the apparatus hitched and out of the station. When the engine or truck arrives at the fire, the first thing that is done, provided the fire be small, is for two men to rush into the building with extinguishers and endeavor to put out the fire with them. Should the fire have gotten headway, this, of course, is not done and a stream of water is gotten on the blaze in short order. The ladders used in this department are very light, weighing only about 2,400 pounds, including the truck, and they are made narrow so that they can go through the gateways to the alleys.

The courage of the men and the intelligence and coolness of the officers account more than anything else for the efficiency of the department. The way the fires are handled is what won the admiration of Princess Marie and she aids not a little in the work. Whenever there is a fire she is notified by secret messenger, as her father and husband do not sympathize with her in her hobby. She always appears on horseback encouraging and helping the men. She often carries messages from one end of the line to the other and is not afraid to go where the fire is fiercest. The accompanying illustration shows her in her firemen's uniform. One day she dressed up in a complete suit of a fireman, trousers and all, and visited the court photographer to have her picture taken. The man was afraid to do it, fearful of the King's censure, but gave in at last to the entreaties and command of the Princess. Two hundred of the photographs were framed and sent to the fire companies of Denmark and are highly prized. When the King and Prince found this out they were exceedingly angry and tried to recover the pictures, but the firemen would not part with them at any price. She often visits the men at their stations and takes an interest in their drill, but her ardor for the service has been largely suppressed by her family, who do not consider it consistent with the life of a princess of the royal blood.

The fire department of the Danish capital is not costly when compared with departments in German cities. It costs the city about one-fortieth of the whole annual expenses, or \$112,000.



PRINCESS WALDEMAR IN FIRE UNIFORM

FIREMEN'S FIRST AID TO THE INJURED

In the fire departments of Berlin and other cities in Germany and the Continent, the men are instructed in the art of first aid to the injured. It is a valuable addition to the regular instruction of fire fighting and should be taught in all fire and police departments on this side of the Atlantic. The city of Boston, Mass., gives its firemen regular instruction in aiding injured persons and the men are required to attend the course of lectures given under the auspices of the Massachusetts Hygiene and Emergency Association. The police, too, have similar lectures. Squads of twenty or thirty firemen attend the lectures given in some convenient room in the fire houses. The course consists of four lectures given once a week, each lasting about an hour.

The first lecture is devoted to the general physiology of the bones, blood vessels and organs, etc. This makes the men fairly familiar with the general location of these various parts of the body and their functions. The bones most liable to be broken and the places of fracture are dwelt upon, also the joints liable to injury and dislocation and the proper place to apply pressure to stop bleeding of different blood vessels. Fifteen minutes is devoted to the demonstration of the application of splints and bandages and the men practice applying these bandages on one another.

Shock, wounds, bleeding and burns form the subject of the second lesson. The men are taught what to do in emergencies in such cases. As shock exists in all severe accidents, the first thing for the men to do is to send for a physician; then place the injured in a horizontal position with head slightly raised; wrap warm blankets

about the body and apply heat to the extremities. The different kinds of wounds are described and simple methods of treatment explained, especially the way to stop bleeding and cleanse and bandage the wounds. Bleeding parts are to be elevated and pressure applied through means of the hands or a tourniquet. The men are also taught how to treat burns. Thus the air must be kept from the affected part and it must be kept warm and covered with oil or fatty substances of some kind. Scalds should be covered with bicarbonate of soda or baking soda.

Fractures, dislocations, sprains, suffocation, etc., are dealt with in the third lecture. The men are shown how to apply splints to a broken leg or arm so that the person may be made comfortable until a physician can be summoned. One of the most important and interesting subjects is the restoration of persons overcome by smoke, gas, etc., and the men learn to give domestic remedies, and if these are not effective, to resort to artificial respiration.

Unconsciousness due to fainting, apoplexy, intoxication, etc., and the proper diagnosis of each case as far as possible are explained and simple treatment taught. This is especially applicable to the police in view of the number of cases where men are roughly thrown into cells and left over night on the supposition that they are "drunks," when the unconsciousness is due to apoplexy, concussion of the brain or the like. At the conclusion of the course, an oral or written examination is given to test the men. They are urged to buy a copy of the "Handbook of First Aid to the Injured," published by the association and sold at cost.

MANILA FIRE DEPARTMENT

The firemen of Manila, P. I., mean well, but their way of fighting fires is not quite up to the American standard. Captain Harry L. Wells, of the Second Oregon Volunteers, who was on duty at Manila, describes the way in which the local department fought a fire.



A MANILA FIREMAN

"The other half of my company, under the first lieutenant, was ordered to man the little fire engine of the English company. As showing the quality of the American volunteer to meet all emergencies in the thirty men he had under his command, he found a competent engineer, an experienced fireman, a first-class engine driver and several men who had belonged to local volunteer fire companies and understood how to handle fire hose. With these he reached the engine house and discovered that the Filipino crew had all gone to sleep, fatigued with their exertions earlier in the evening. When he wanted to know why they did not turn out to the fire he was assured that they were very tired; that the horses could not possibly draw the engine after so much exertion as they had already had, and that if the fire burned till morning they would come again and see what they could do. This settled it. He did not waste any more time on that outfit. Having his men hitch up the team with lightning speed he put one of them on the box, and that engine went to the fire with the "too-tired" horses on the keen jump, the driver yelling at them and hitting them a lick with the whip at every jump.

"The new engineer took the antiquated machine in charge, one that he had never seen before, and with no light save that from the burning buildings studied its construction while steam was being gotten up in the boilers, and had her ready for business as soon as there was steam enough to throw a stream. Meanwhile the Filipino hose cart had been brought to the fire by its crew, stimulated by bayonets, but they could not be induced to go within two blocks of the blaze. From this cart I secured two lengths of hose, one without a nozzle, and manned them with half a dozen men each. We then attacked the fire from my side of it, and it never again crossed a street. The only force we had on our streams came from the gravity force in the water system, and it would throw a stream only about fifteen feet, or just above the floor on the second story. Nevertheless, we made up for this by getting close to the fire. I remember one tight place, in which the boys were so close to the fire that a pipemen could remain only a minute at a time. One at a time they took their turn and then dropped back to be soured with a bucket of water to cool them



A MANILA HOSE WAGON

off and keep them from bursting into a blaze. But they stuck to it, and it was the work done at this particular spot which checked the flames on this side, while the engine was doing like work on the south, aided by other lines of short hose from the hydrants."

POLICE CHIEF A BORN FIREMAN

COLONEL N. B. THURSTON, who has just succeeded Devery in the New York Police Department, is an interesting figure in Mayor Low's reform administration. The new chief deputy-commissioner was formerly lieutenant-colonel of the Twenty-second Regiment of the National Guard of New York. For several years he has been State Inspector of Small Arms Practice, and he is remarkably well informed in regard to military regulations.

His memory is phenomenal. He can recite without an instant's hesitation the substance of any paragraph in the State Manual of Arms, and can give the page, paragraph and section covering almost any moted pointed in military practice. In his day he has confounded a host of disputants, who have questioned the accuracy of his rulings or statements, by referring them instantly to the particular words in the Manual covering the point.

There are fifteen thousand militiamen in the state of New York. Colonel Thurston, it is said, knows practically every one of them by sight and name. Again and again, when a country militiaman has come to New York City, he has carried home with him the conviction that Colonel Thurston is the greatest man on earth, because that officer, happening to meet him on the street, has greeted him without hesitation, saying:

"How do you do, Brown? How are Captain Smith and Sergeant Jones of the Hundred and Eighty-ninth Detached Company of Goshen?"

The result of this is, of course, that the Colonel is among the most popular men in the state with the National Guardsmen. His duties as Inspector of Small Arms Practice have taken him into the most remote sections, and from every place he has carried away an intimate knowledge of the *personnel* of the regiment and company.

The Colonel has a picturesque fad that has made him notable in New York. Morning, noon or night, he has for years past tried to

put in an appearance at every fire in the city that amounted to anything. It was never too late or too early, too hot or too cold, for him to turn out with the "boys," as he calls the firemen. He was long ago adopted by them as one of their very own, and he is the only private citizen in the metropolis who is permitted to "ride with the machine." At the fire he is not a mere onlooker. He grabs a rubber coat and helmet, just like the professional fire fighters, and pitches in, taking a place at the nozzle, or anywhere else where his services may be put to advantage. He can stand more smoke than any paid member of the department; time after time he has held out in cellars and other low places long after the other men have been compelled to give way. There are over two thousand fire boxes in New York city. They are all numbered, and he knows the location of every one by heart. If, for example, five hundred and sixty-two is run in, Colonel Thurston, without looking at the book, can tell on what street, and at what corner, this box is.

The Colonel lives in an apartment house on East Eighty-seventh street, three flights up. Long ago a private fire signal was put into his place by the city authorities. This strikes every fire in the city. If the fire happens to be within the particular fire district in which he lives he will turn out, even in the middle of the night, if it is only a first alarm. A third or fourth alarm will call him to any part of the metropolis. The nearest engine house to his home is four blocks away. So alert is he in his movements that, though the elevator may be stopped in his house and he has three flights of stairs to descend, besides dressing, he can get down in time to see the engine as it passes. He was talked about for the position of fire commissioner in Mr. Low's administration. When this post went to another, his friends backed him strongly for First Deputy Police Commissioner, and he was chosen on his record as a military executive and disciplinarian.—*Saturday Evening Post*.

JERSEY CITY'S FINE POLICE STATION

THERE is in course of erection a new station house for the Jersey City, N. J., police force. It is situated in the sixth precinct on Central avenue and is shaped like the letter "L." The building is 100 feet deep and three stories in height. On the first floor is the main office, to the left of which is the captain's bedroom, bath, etc. At the rear is the sergeant's room, and still further back a room for storing records and the large room for the reserves, extending across the building.

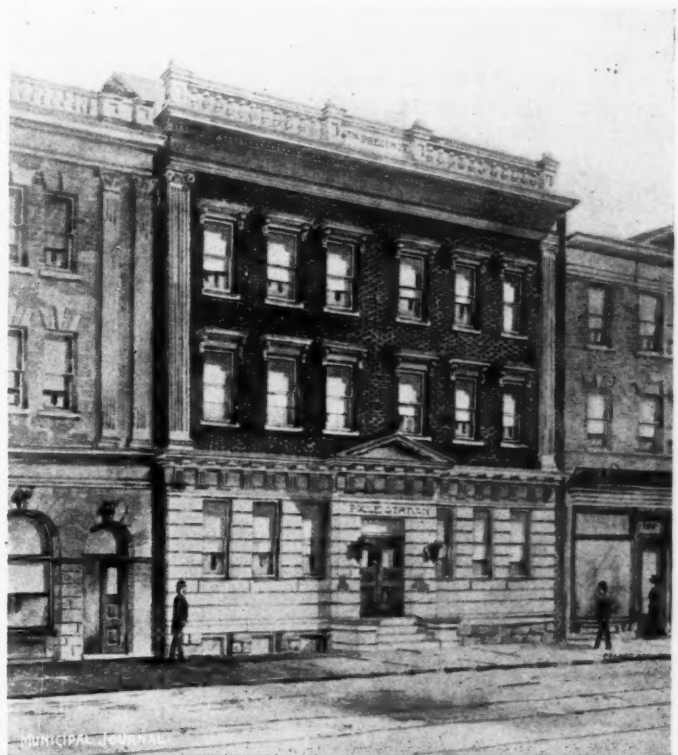
A broad hallway connects the main office with the reserves' quarters and the main staircases leads from this hall to the upper floors. In the rear of the reserves' room and on the right is a prison containing eight steel cells, while at the left is the patrol station with accommodations for the patrol wagons and stalls for the six horses.

On the second floor are the dormitories. There are four large sleeping apartments for the patrolmen, a room for the roundsmen and a large toilet and bath. Over the patrol station is a room for the drivers and a loft for storing feed. The third story of the station is used for a dormitory for the detectives, a store room and a large armory.

The architectural features of the building have been well looked after. The basement is built of green stone, the first story and all trimmings of Green River lime stone and the cornice and pilasters of terra cotta. The third and fourth floors are of Harvard brick. The partition walls are of brick, affording both strength and fire-proofing. The floors are double, the upper layer being of maple. The trim is of Flemish oak except the base, which is of marbelized slate. The structure is lighted by electricity and steam heated. The Miller system of ventilation keeps all the rooms, except the prison, supplied with warm, fresh air and removes the vitiated. The prison is ventilated by an electric blower in the skylight which discharges the foul air from the roof.

The architect, Mr. C. F. Long, has so arranged matters that there are no dark rooms or corners to catch dirt in the building. The dormitories are large and airy and in each of them will be a bed and clothes closet for each man. These closets will have wire screens for the bottoms and tops to ensure a plentiful supply of air for ventilation. The tops are so slanted that nothing can be laid on

them and thus stop circulation. Provision has been made for the comfortable housing of more than 200 men in case of emergencies. When completed, the structure will have cost \$30,000 and will form



JERSEY CITY'S NEW POLICE STATION

the seventh station of modern design in the city. In all of them the reserves have "all the comforts of home;" good beds, well ventilated rooms, baths with hot and cold water and everything to make the men contented.

FIRE AND POLICE ITEMS

POLICE TO LEARN BOXING.—The members of the police force of Salt Lake City, Utah, will have lessons in boxing added to their daily routine. The idea is to increase the efficiency of the police and afford diversion and healthful exercise for them. The chief is responsible for this new idea and he has furnished the money to provide gloves for the use of the force.

NO STANDING IN THEATRES.—Fire Commissioner Sturgis, of New York City, has issued an order that all theatres must not sell tickets for standing, but every one must have a seat. The commissioner is keeping a close watch on the theatres and all that disobey the order are reported to the Corporation Counsel with the request that they be prosecuted. The fire regulations provide that the aisles of all theatres and similar houses shall be unobstructed during performances and the presence of people standing in them violates this regulation.

TO COMBAT CRIMINALS.—The chiefs and marshals of Alabama have formed an association to aid in the detection and apprehension of criminals. It is the first association of the kind in the South, and is modeled after the National Association of Chiefs of Police. Thirty-five chiefs and marshals assembled at Birmingham, Ala., and held a two days' session at which the association was formed and the constitution adopted. The initiation fees and annual dues were fixed at \$2 for each member. The active members will consist of the chiefs and marshals, etc., and the honorary members of the boards of commissioners and members of departments of public works.

ANOTHER POLICE ORGANIZATION.—A movement is on foot to form the Pacific States Association of Chiefs of Police to work in conjunction with the national organization. The chiefs of police in all the cities of Washington, Oregon, California, Idaho, Nevada, Colorado, Montana and Utah are to be members of the organization. Chief Whittman is the principal factor in the movement, although other chiefs have been lending their assistance. The object of the association will be for a closer communication and annual meetings of the chiefs, at which ideas can be exchanged calculated to benefit the members in every way. Better protection will be afforded society from this closer bond of the officers.

POLICE TELEPHONE SYSTEM.—The Chief of Police of Chester, Pa., William Leary, has just introduced a system of police signals in the department which as a makeshift for small cities may answer, but it does not compare with the favorable work of the Gamewell Company. Police telephone stations have been introduced in all the districts in the city and officers are required to call up during the night and day at two, four, nine and twelve o'clock. Heretofore the officers called up at nine only. The officers are kept in close touch with the headquarters and in case of a burglary or fire the officer immediately reports the same. The total cost to the city is only about \$140, and this is practically nothing as compared with the good results.

SUCCESS OF SMOKE HELMET.—The efficiency of the smoke helmet in enabling firemen to work right in the smoke and so get at the base of the fire, was well demonstrated at a recent fire in Liverpool, Eng. At the fire in question there was a great amount of smoke and gas, and it was almost impossible to get near enough to locate where the fire was burning. A new engine appeared on the scene, however, which generates its own electricity by which air is pumped into smoke helmets for the firemen and electric lights are supplied them in addition to pumping a good supply of water. Protected by these helmets the men were able to work in the smoke and gas without difficulty and so could direct their streams on the base of the fire.

MUNICIPAL ELECTRICIANS.—The Executive Committee of the International Association of Municipal Electricians, of which

President A. S. Hatch is chairman, has selected the following papers to be read at the convention to be held October 7-9 at Richmond, Va.: "Illustrated Lecture on Fire and Police Telegraph Systems and Joint Use of Conduits," by Mr. Charles F. Hopewell, Cambridge, Mass.; "Municipal Control and Ownership," by Mr. Walter M. Petty, Rutherford, N. J.; "Relation of Electrical Interests to Other Branches of Municipalities," by Mr. William Brophy, Boston, Mass.; "Classifying of Records of Electrical Departments and Standard Specifications for Supplies and Contracts," to be followed by report of Committee of Rules for Construction, by Mr. Morris W. Mead, Pittsburg, Pa.; "Telephone Service in Connection with Fire and Police Signal Systems," by Mr. Jere Murphy, Cleveland, O.; "Electrical Government in Small Cities," by Mr. A. S. Hatch, Detroit, Mich. Mr. F. P. Foster, Corning, N. Y., is the secretary of the association.

FIRE ESCAPES USELESS.—In his annual report to the Governor of Pennsylvania, State Factory Inspector James M. Campbell calls special attention to the use of poor fire escapes. He said: "Experience has demonstrated beyond a doubt that for buildings four or more stories high, the outside, open, iron fire escape is not always a safe means of escape in case of fire. The late disastrous fire on Market street, Philadelphia, where the building was properly equipped with outside, open, iron fire escapes, proved that this means of escape in case of such a fire was of no account, from the fact that a number of people were burned to death in attempting to descend the escapes. The General Assembly should enact a law providing for better means of egress in case of fire for high buildings. The tower escape, recommended to the Legislature in 1897, by William C. Haddock, now Director of Public Works in Philadelphia, is the safest and most complete means of egress yet presented to the public." There are other well known fire escapes, such as that made by the Fire Extinguisher Manufacturing Company of Chicago, which have proven efficient under trying circumstances.

FIRE AND POLICE PERSONALS

—Chief Reno, of the Rensselaer Fire Department, has been reappointed by the Board of Fire Commissioners of the greater city.

—Captain Cornelius Ryan has been elected chief of the Police Department of Hartford, Conn., to succeed George Bill, deceased.

—Chief of Police C. W. Austin was elected president of the Alabama Association of Chiefs of Police and Marshals recently formed in that State.

—San Jose, Cal., is without a chief for the present inasmuch as Chief James A. Kidward has resigned. He gives as his reason for this step that his private interests require too much of his time.

—Chicago has the oldest policeman of any city in the world. His name is Alexander Beaubien, and in January celebrated his eightieth birthday and has been on the force since 1865. He was the first white child born in Chicago.

—Chief John W. Carleton has tendered his resignation as head of the New Britain, Conn., Fire Department. His duties as superintendent of the Union Manufacturing Company are such that he cannot spare the time for the Department. He has been chief since 1888.

—The police commissioners of Wilmington, Del., have dismissed Chief Eugene Massey from the force on the charge of bribery. The trial showed that the Chief was guilty of conduct unbecoming an officer and of failing to suppress gambling and policy playing in the city.

—Clate E. Warner, Chief Police of Billings, Mont., died on February 8th, at the age of forty years. For some time past he had not been able to attend to his duties. Previous to last spring, when he was appointed by Mayor George, he had made a good record for himself on the force.

—The insurance agents of Memphis, Tenn., have recently suggested to Mayor Williams that he remove Chief Carroll of the Fire Department. The agents consider him entirely incompetent on

account of the large loss that has taken place lately and they threaten to raise the rates if the Chief is retained.

—For the second time Chief Thomas H. Hilton, of Salt Lake City Police Department, has tendered his resignation to Mayor Thompson. The Mayor is anxious to get rid of Chief Hilton so that he may reorganize the department, but each time that the Chief has tendered his resignation to His Honor and the Council, the latter has refused to receive it.

—Chief of Police O'Day, of Tonawanda, N. Y., was suspended by the Board of Trustees of the town for having violated one of the rules of the department against playing cards in a saloon. A patrolman, whom the Chief had suspended, preferred the charges against his superior. Chief O'Day, however, has been reinstated, the charges having been proved false.

—In his report to the Mayor of North Adams, Mass., Chief of Police Dinnen recommends that a whipping post be established in the city for the purpose of punishing drunkards and cruel husbands. The Chief says that the family often suffers more than the father when the latter is locked up or fined for the above and similar offences.

—The Kentucky statutes give the boards of police and fire com-

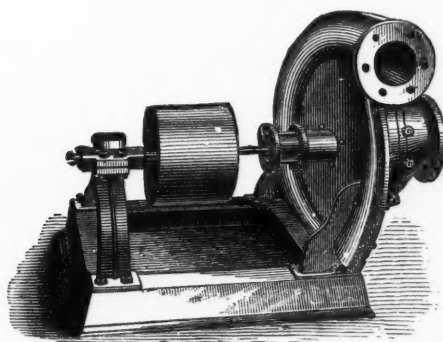
missioners full power over the police and fire departments, but it has been resolved by the Board of Police and Fire Commissioners that Chief J. Waller Marshall, of the Police Department of Lexington, be placed in full charge of his department, inasmuch as they have full confidence in the ability of the Chief.

—Chief Charles N. Hogg has been nominated to succeed himself as chief of the fire department of Binghamton, N. Y. There was much opposition to his appointment on the part of one of the commissioners, inasmuch as the Chief's resignation had been demanded by the preceding Board of Commissioners on the ground of insubordination and violations of the rules of the department.

—At the first meeting of the Ohio Police Association, held at Columbus on January 14th, the following officers were elected: President, Mr. W. P. Tyler, Columbus; first vice-president, Mr. George E. Corner, Cleveland; second vice-president, Mr. Fred H. Vogelmier, Newark; secretary-treasurer, Mr. John C. Whitaker, Dayton. The following will serve as the Board of Governors: Chiefs W. W. McDowell, Youngstown; E. J. Tracey, Zanesville, and J. W. Weil, Mansfield. The object of the association is to build up official and mutual friendship between the police departments of Ohio and to give to each chief the experience and show the methods of the others.

THE IMPORTANT WORK OF THE CENTRIFUGAL PUMP

The Craft Pattern. Among the Best—Used for Dredging or Drainage—Indispensable in Reclaiming Land—Extensively Used for Irrigation—Sewage Contractors Cannot Get Along Without It



THE centrifugal pump is a modern necessity in every piece of construction work where dredging or drainage is involved. It has many other uses to which it may be readily applied in which is shown its importance. It is used extensively in both public and private work. Municipalities which

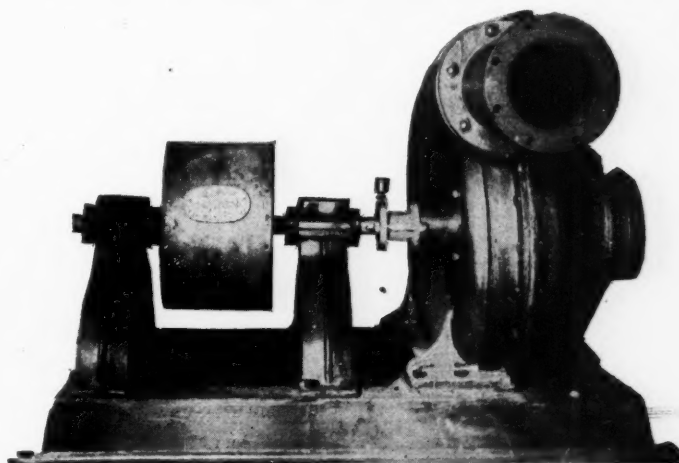
perform their own construction work under the day labor system find its services invaluable. The accompanying cuts represent two types of this remarkable piece of machinery—known as the Bush patent centrifugal pump. These are manufactured and sold by Mr. Jesse Craft, of 260 Front street, New York City. These pumps are used all over the world, and as a flattering evidence of the superiority of this particular type, Mr. Craft has received numerous letters from the various foreign users of the pump which contain the highest words of commendation.

So necessary are these pumps that it would be almost an utter impossibility to undertake a large contract for any sort of public work, such as for sewers, drainage, bridge foundations, caissons, cofferdams, dredging or reclamation of land without the assistance of a good centrifugal pump. In the work mentioned above the pump is indispensable. It has demonstrated its practical usefulness in clay pits, brick yards and quarries, for irrigation purposes and excavations of all kinds, where large quantities of water are required to be pumped. One of the peculiarities of this class of pumps is that it will pump stones, rocks, coal, etc., which are mixed with water, as easily as it will handle clear water.

To the uninitiated it is a remarkable and interesting scene to witness the operation of one of these pumps. The observer is sure to be caused the greatest wonderment as he watches the large quantities of foreign matter, sand, mud, sod, etc., poured forth from one of these pumps at the rate of many tons per hour. But this is not the only marvelous thing about it; at times, when required, it will pump this mixed material through a long pipe main for a distance of from one hundred to 5,000 feet, finally discharging it at the point of destination. In doing this it performs a double duty; first, it takes the stone, mud and refuse of the water from the

bottom of a channel which it is desired to make deeper, and second, delivers it to any point on adjacent marsh land, within a distance of a mile, where the owner wishes to convert a worthless shore property into a valuable water front. This process was employed at Manhattan Beach a while ago, where the Craft improved dredge pumps were used. The matter was pumped from Sheepshead Bay, forced through a line of discharge pipes at times 2,500 feet long, and delivered at the desired point. To-day this reclaimed land surrounds the Manhattan and Oriental Hotels, which stand as a fitting testimonial to the usefulness of Mr. Craft's centrifugal pumps. Similar work has been performed on the canal at Freeport, Long Island; for the United States Government at the Gulf Quarantine Station at Biloxi, Miss. Strange as it may seem, over sixty of these large dredge pumps were employed in the phosphate industry in the State of Florida alone.

A home trade is a good testimonial for any manufacturer, and this Mr. Craft certainly has, for most all the large contract work done in Greater New York, New Jersey, Connecticut and neigh-



boring cities, has been performed by these centrifugal pumps; for instance, the large sewers at Bay Ridge, Jamaica, Hoboken and Manhattan. The pumps were used in the construction of the bridge foundations at Newtown Creek, the bridge at Paterson, New Jersey, and the operations of the Pennsylvania Railroad at Weehawken, New Jersey.

Although these pumps are subjected to great strains and incessant wear, as they are often run night and day, and although the mass of matter which they handle amounts to many tons in twenty-four hours, they are not liable to get out of order and are operated with comparatively no wear. They are easier handled and cheaper for operation than any first-class pump on the market. These pumps have been supplied to most all of the large firms in the brick manufacturing business and the owners of the principal clay pits in this country. They have been used with great effect on the foundation of the new power house for the Brooklyn Rapid Transit Railway, the foundation work of the new court house in New York City, the

Harlem Ship Canal, the extension of the Brooklyn Water Works on Long Island and the new Croton aqueduct. The pumps have been introduced in the South in large numbers for irrigation purposes, where they also play an important part in the cultivation of rice fields.

It is not surprising that the business for centrifugal pumps has been largely increased during the past year. The field has widened and the number of sales has been greatly increased. The owner, Mr. Craft, is devoting incessant study to not only advancing his business interests, but endeavoring to improve that which seems already perfect. The prospect for the coming year is most promising.

STUDEBAKER WIDE SPRAYING ELECTRIC CAR

THE Colorado Springs and Suburban Railway Company, in pursuit of its aggressive policy for improvement, has installed the latest model of an electric car sprinkler, manufactured by the Studebaker Brothers Manufacturing Company, of South Bend, Ind.

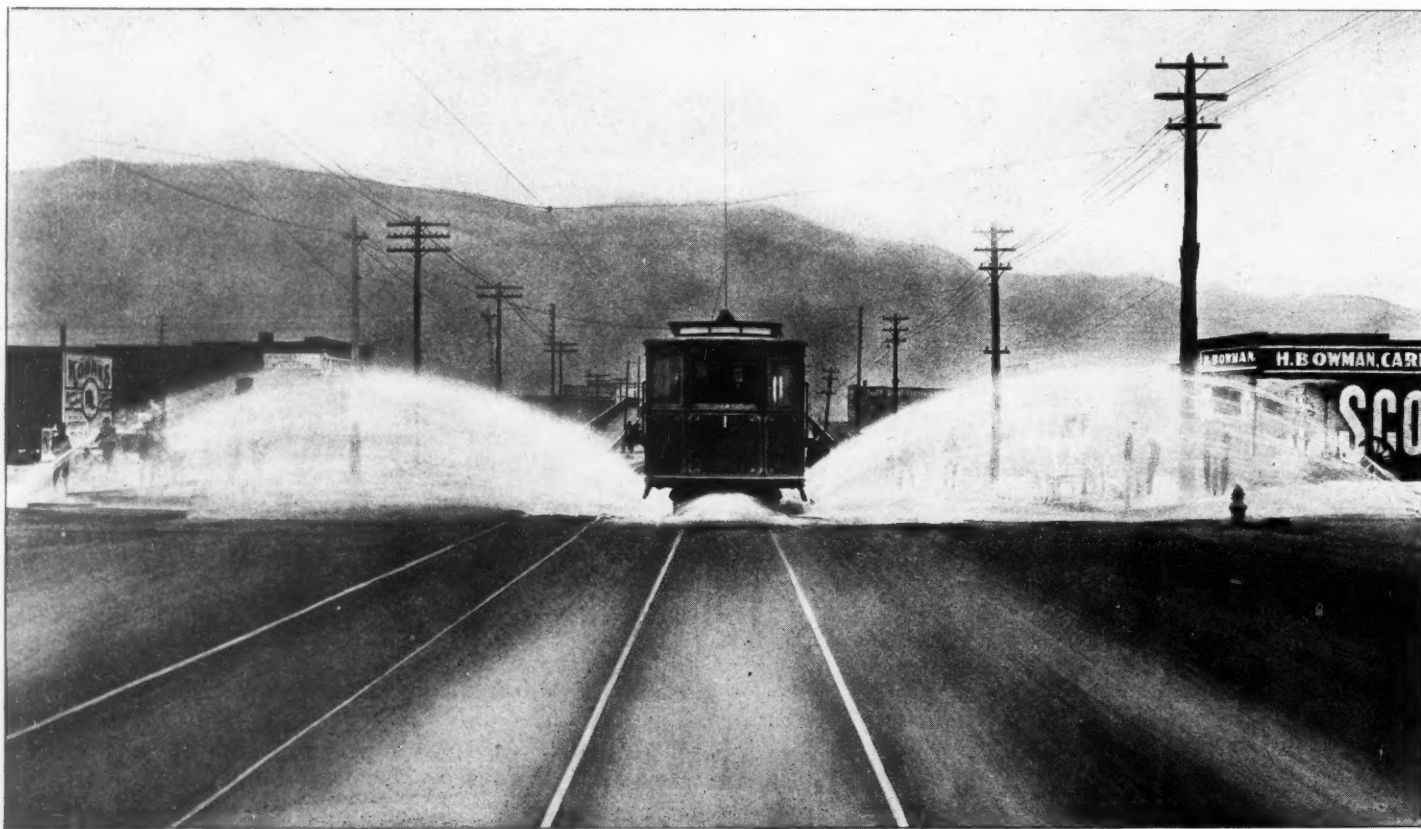
The difficulties arising in the keeping of the streets well sprinkled are more peculiar here than in any other city of the United States. There is no other city with such universally broad thoroughfares, nor anywhere is there as little necessity of paving. Coupling with this the bright rays of the sun, dry air and wind storms, together with the necessity of sprinkling the year around, there is a demand for a machine that will throw a body of water, with a sufficient force to spray to the curb, in the least time and with a saving of running expense. In its construction this car covers as many of the points as it is possible to do. To the passer-by, it has the appearance of the regulation street car, and when not sprinkling, due to its being finished in the company's regulation colors, it is not particularly noticeable, except that shutter windows are used instead of the glass. Both ends are full glass vestibule, the motorman operating in his usual position, protected from gales of winds or frigid temperatures. Built on a single truck gear, the car is run by two sixty-horse power motors of General Electric type, the load being carried on graduated springs. A steel tank, carrying 2,600 gallons of water

is enclosed with sufficient room for a person to pass from end to end on either side.

The objectionable feature of the swinging arm, used on the car sprinkler operated in this city a few years ago, is overcome by the spray being thrown from two sprinkling heads, found on either side, about the center near the trucks. The water is forced from these heads by two individual force pumps, run by a thirty-horse power motor, and located at the end of the car. The amount of water thrown, together with the width of the spray, is governed by levers at either end. An emergency brake is also supplied for quick work in the passing of a moving vehicle, or running at high speed. The sprinkling apparatus, as well as the car, can be operated at either end. A third sprinkling head is located in front of the center of gear for the flushing of the tracks or between them.

In the test with the car standing a spray of water seventy-eight feet in width from center of track was thrown with the use of one head, while with both sides open a distance of 120 feet was covered. A still further test was the run on Pike's Peak avenue, when, at a speed of about ten miles an hour, this exceptionally wide avenue was satisfactorily covered.

The machine will unquestionably meet all of its requirements, and is a credit to its builders, as well as its purchasers.



THE STUDEBAKER WIDE SPRAYING ELECTRIC CAR SPRINKLER

THE NOISELESS MANHOLE COVER

If half of the important cities of the country were as consistent in their street pavements as Philadelphia, the nerve racking and unsightly iron manhole tops would long ago have disappeared from their asphalt and similar pavements. Logically there is no good reason why an asphalt filled manhole top is not essential to a good noiseless pavement, provided it is practical, durable and reasonable in price. That a great many of these cities appreciate the force of this logic is evidenced by the increasing number to adopt such a top.

The practical solution of the noisy and unsightly top problem has been reached after much experimenting and research as to filing and a great deal of thought and the expenditure of much money in perfecting designs, etc. The first tops were clumsy, but they have stood nearly seven years of continued and heavy traffic and are to-day in excellent condition—much better than the pavement in which they stand. They were also high priced, as but few of them were made. Those few proved so good, however, that the demand for them began to grow and still continues to spread in their localities. With the increased number of cities to adopt these tops have come increased facilities for their manufacture, improvements suggested by experience, a better knowledge of the requirements in the way of filling, and not the least a reduction in the price. It is also notable that the asphalt tops have become standard wherever they have been introduced. One would hardly attempt to justify an asphalt pavement on the ground that it is as cheap as Belgian block, nor do we urge the adoption of asphalt tops because they are as cheap as iron ones, as they are not. As compared with iron ones, however, the price is less than asphalt pavement compared with Belgian block and the little difference in expenditure is entirely lost in the great improvement produced in the entire area of an expensive pavement. No matter what a pavement may cost, it is no better than the poorest part of it and a rattling iron manhole top makes the best pavement a mighty poor one, both in sightliness and utility.

A reference to the cuts indicates better than words how much superior are the asphalt tops. These cuts are reproduced from photographs of average specimens and of tops that have been in place for some time. Philadelphia was the first city to adopt the asphalt tops, and to-day uses them in all noiseless pavements to cover all street openings. Others have adopted them until now they are in

actual use in seventeen cities and on probation in many more, where the result will be to eventually make them standard, as has been done in other cities where they have been placed on trial.

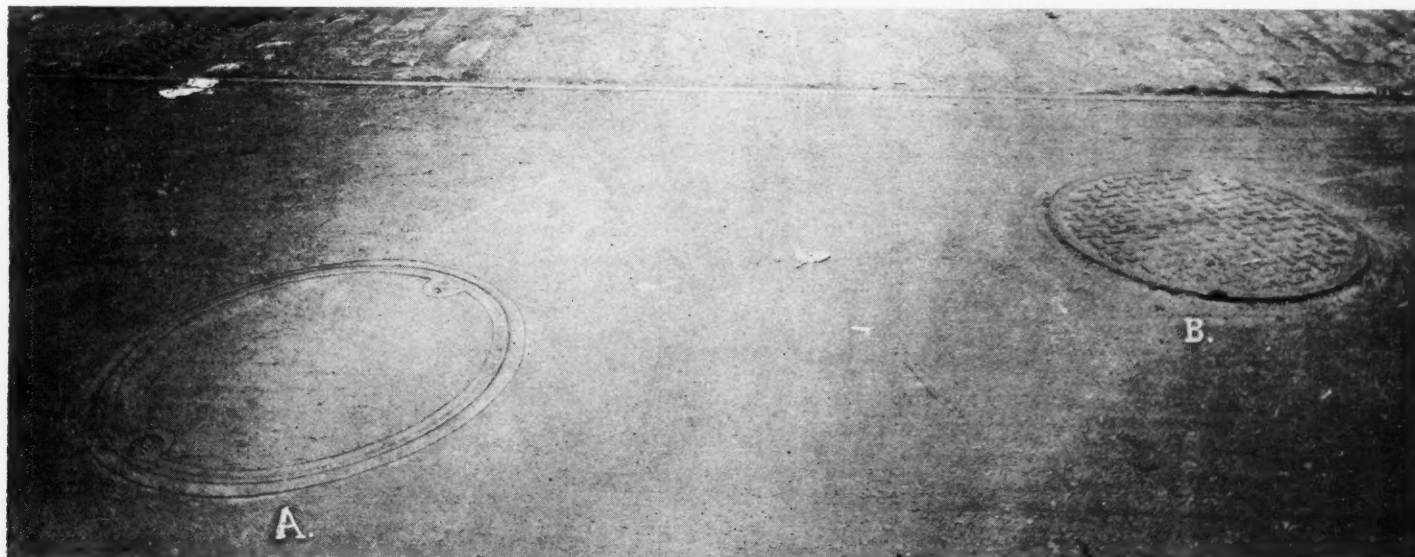
Regarding their manufacture much may be said. The ordinary iron top, simply as a product of the foundry, is in no way comparable to the asphalt tops. There must be no rocking or clattering nor that abundance of lost motion necessary in the ordinary tops to make up for inaccuracies in the castings. They must be made with a nicety and a fit that is as much superior to the ordinary top as a watch is superior to a mowing machine. This care in manufacture insures noiselessness, durability and interchangeability obtainable in no other way, so that simply as manhole top castings, irrespective of the asphalt filling, they should be enough better than ordinary tops to justify the very little difference in cost.

The filling must be compounded with great care and skill and



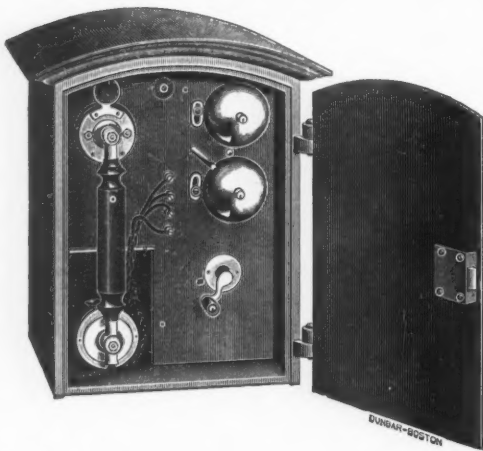
A SHARP CONTRAST BETWEEN THE OLD AND NEW

cooked and applied with greater care. Much experience and a knowledge of climatic condition are necessary to make a durable filling. Only the highest grade of material can be used and an absolute knowledge by analysis is necessary to provide against inferior materials and mixtures. With these essentials carefully looked after an asphalt top is turned out that will last longer than the pavement, that is but little higher in price than iron, and that makes possible a continuous surface of like color and consistency in the pavement and makes it what it should be—noiseless and handsome in appearance. Then why continue to use iron ones?



A.—AN ASPHALT FILLED COVER. B.—THE OLD STYLE IRON COVER

TELEPHONES FOR OUTDOOR USE



It has been suggested to us that a telephone for outdoor purposes would meet the requirements of many of the smaller municipalities and towns. It would be particularly acceptable to the Police Department, as stations could be located in the outlying sections and connected to the office at

headquarters.

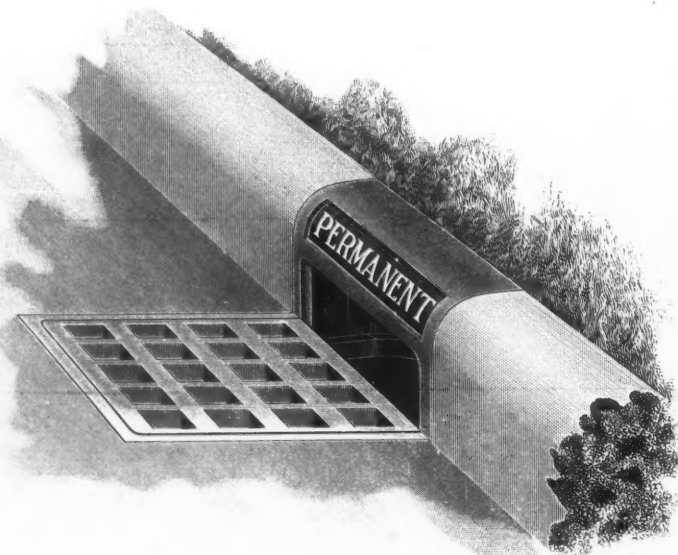
The telephone consists of a hand microtelephone, magneto and two cells of dry battery and is securely encased in an iron box which thoroughly protects the same from dust, moisture, etc., the door being securely fastened by a spring lock.

This apparatus makes an excellent substitute for an expensive and complicated police signal system, as several stations can be placed on one pair of wires, and all lines can be run on poles belonging to the telephone and telegraph companies operating in the vicinity.

The illustration shown here was kindly loaned to us by the Ericsson Telephone Company, of No. 296 Broadway, New York City. This company manufactures high grade telephones for all purposes, and any one in need of telephone apparatus of any description would do well to write to them for particulars concerning their different systems before purchasing.

A SPECIAL CURB BOX

THE city of Cleveland has one of the most beautiful boulevards in the country. It is known as the New Clifton. It extends along the entire western lake front for several miles. Its topography lends a picturesqueness to the view which is seldom found in a boulevard of its kind. In addition to this the landscape architect has lent a charm to the general effect which cannot be excelled. The construction of this boulevard has been carried out in the most careful manner. The



SPECIAL CURB BOX FURNISHED FOR CLIFTON BOULEVARD

smallest details have been given the most careful consideration by the Park Commissioners. The crubing, the roadway, the trolley lines, the trees, the shrubbery, as well as the lawns, have been arranged and treated in such a manner that each contributes its part to the perfect beauty of the whole. The engineers in charge of the work were permitted to dictate what drainage appliances should be employed in connection with the drainage system. The products of the Permanent Manufacturing Co. were settled upon as the best suited to meet the demands in this line. The accompanying illustration will show how perfect it is in its adaptation to the situation.

ANOTHER AID TO COMMERCE

ONE of the most helpful aids to fast time for long distances is the railroad dining car. Precluding, as it does, the necessity of stopping trains at lunch and dining stations, it contributes materially to shortening the time of passage between distant points, and in that way it is more helpful than profitable. This feature of railroading is comparatively of recent origin. Probably it is still in its original stage of development, although it is difficult to determine how or where it can be improved. But in the railroad business nothing is final. The New York Central Railroad, which operates more of these cars as well as more sleeping and parlor cars than any other in the world, has twenty-eight dining cars and eight restaurants, and is now feeding more than 8,000 persons a day. Each dining car costs \$15,000. Including the food supply constantly on hand, the Central has therefore about half a million dollars invested in the enterprise of feeding passengers while they are moving.—From the *Northern Budget*, Troy, N. Y.

GARBAGE AND REFUSE DESTRUCTION

THE above caption is the title of a 24-page pamphlet by Mr. William F. Morse, sanitary engineer, member of the American Public Health Association, Franklin Institute of Philadelphia, etc. Mr. Morse divides his subject into seven parts: (1) Institutional Waste and Its Treatment, (2) The Employment of Heat from Institutional Waste, (3) The Utilization of Municipal Refuse, (4) The Garbage of Cities, and Its Disposal, (5) Power from Mixed Municipal Waste, (6) Residuums; Their Value and Uses, (7) The Morse-Boulger Destructor.

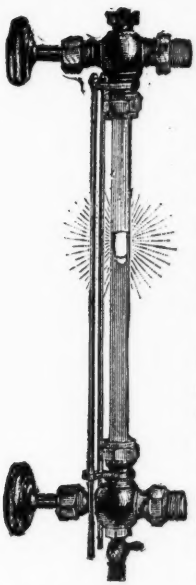
The author's experience covers a period of many years and there are a score or more of plants which have been in use in institutions and by cities, for a long time, which have given the utmost satisfaction. There is no subject of greater importance now before the American cities than the systems evolved for the collection and destruction of its waste matter. The ideas involved in Mr. Morse's system, or rather the system which he describes, have been the result of years of experience, not only on this, but on the other side of the Atlantic.

"When a community disregards the laws of health and cleanliness," says the author in his preface, "by unsanitary methods of caring for its dangerous waste it is certain to pay the penalty in an increasing death rate.

"The latest results of disposal work have shown that all garbage, refuse and miscellaneous waste and inflammable substances can be destroyed on the premises, or within the area of collection, whether in large or small quantities, in a single dwelling or in a great city, by means that are at once sanitary, efficient and economical, and it is the purpose of this pamphlet to illustrate the methods and apparatus employed."

Mayors, aldermen, councilmen, city officials and others who may be interested in the subject of garbage and refuse destruction, will be able to secure a copy of this valuable pamphlet free of charge on application to the author at 39 Cortlandt street, New York.

AN IMPROVED INDICATOR GAUGE GLASS



ONE of the many useful inventions to steam users is the Allen indicator gauge glass for steam boilers, an illustration of which is shown herewith.

The water level in the glass is readily shown by a floating indicator, the construction of which enables it to always float at the water level in an upright position without aid from the sides of the gauge glass. The indicator's peculiar shape and action has a tendency to keep the gauge glass clean and free from choking, thus preventing many accidents and also much trouble and annoyance to the engineer.

These gauge glasses are especially adapted to dark locations, as they can be seen clearly and quickly, owing to the special composition of which the indicator is made, and the use of lights is, in almost every case, unnecessary. This fact alone is a recommendation worthy of much notice, especially when the very low cost of these gauge glasses is considered. The glasses are supplied in five-eighth inch and three-quarter inch diameter and all lengths, and will fit any gauge fittings

of those diameters.

The Contractor's Tool Company, 118 South Sixth street, Philadelphia, Pa., has the exclusive control of these glasses and also manufactures and deals in tools and machinery used in the laying of asphalt, pitch and cement, and general contractors' supplies.

DIGGS FIRE EXTINGUISHER COMPANY



THIS is the title of a new company recently organized by Mr. D. W. Diggs, the inventor of the Diggs-Upright, which has taken over his late business together with plant, patents, stock on hand, etc., and the business will be continued at the same number, 141-3 Centre street.

Larger capital will be employed to develop and carry on the business, which has been made necessary by the rapidly increasing demand for his chemical fire apparatus.

Mr. Diggs has experimented for years in this field and has now brought his machine to a point of development where men of practical knowledge do not hesitate to say that it is nearest to perfection of any on the market as regards safety, efficiency and quickness of action. The N. Y. C. & H. R. R. Co. and the Metropolitan Street Railway Co. have adopted the Diggs-Upright Extinguisher upon the favorable reports of their master mechanics after testing and comparison with other well known makes.

On a hot and sultry day of last August one of the Metropolitan Street Railway cars happened to take fire directly opposite the building in which the office of Mr. Diggs, the inventor of this extinguisher, is located. One of the clerks in the office happened to notice the fire and grabbed one of the Diggs extinguishers, ran out into the street and used the machine so effectively that the fire in the car was immediately extinguished. Mr. Diggs told the superintendent that if he could have all his cars take fire directly in front of his office, as in the case noted, he would be pleased to extinguish the fire in all such cases free of charge. This is only one of many instances where the efficiency of the Diggs Fire Extinguisher has been demonstrated and will serve to account for the rapid growth of its popularity.

The manufacturers of the Diggs-Upright machine are so confident that they have the best machine ever made that they unhesitatingly challenge any machine in the market to contest their right to this claim.

The fact that some of the most conservative corporations and firms in the country have adopted this machine on its merits would

seem to warrant them in their claim, especially where they have, when asking for samples to be sent, stated that they wished them for comparison with makes that have heretofore been regarded as the standard and the best made.

TRADE PUBLICATIONS

—We have received an illustrated copy of the prospectus and catalogue issued by the National Web Tile Sewer Company of Syracuse, N. Y., which contains 32 pages, bound in a handsome cover, and can be had upon request.

—The Watson Wagon Company, of Canastota, N. Y., have just issued a handsome 12-page catalogue with cover, illustrating the various styles of wagon it manufactures, and giving prices. The catalogue will be sent to any address upon request.

—The Morris Machine Works of Baldwinsville, N. Y., have issued a handsome catalogue treating of centrifugal pumps, etc. They have two large pumps now in course of construction which will be shipped to the Galveston Wharf Company, Galveston, Texas.

—The Syracuse Chilled Plow Company, of Syracuse, N. Y., has issued a beautiful 56-page catalogue, with handsome cover, which contains prices upon wood and steel wheelbarrows, contractors' plows, steel sewer buckets, drag road and wheel scrapers, etc.

—All of our readers who are interested in good roads machinery will be glad to receive a catalogue of the Ward Plow Co., of Batavia, N. Y., which describes its well-known road plow and kindred implements. It is a catalogue of 40 pages, bound in a handsome red cover, thoroughly illustrated.

—In a neat, 20-page catalogue, with a handsome cover, the Dunn Manufacturing Company of Pittsburg, Pa., gives a fine description of its extensible trench braces. Several full page illustrations show the efficiency of this brace in actual operation. Contractors will do well to secure a copy of this catalogue.

—We have received from the Consolidated Car Fender Company, 39 Cortlandt street, New York, an elaborate 8-page calendar, large folio size, containing besides maps of the world, a lot of statistical information. It is the most elaborate thing of its kind received this year. The calendar can be had for the asking.

—The Baldwinsville Centrifugal Pump Works, of Baldwinsville, N. Y., have issued an attractive and profusely illustrated price-list and catalogue of the irrigating and drainage outfit specialties which they make, including pumps, engines, boiler fittings, etc. A postal card request for the catalogue will secure a copy.

—The advertising department of the C. H. & D. Railway is sending out copies of the song, "The Shade of the Palm," as sung by the Florodora Opera Company, upon the receipt of fifteen cents in silver or stamps. In order to secure a copy it will be necessary to address "Music," care of the C. H. & D. Railway, Advertising Department, Cincinnati, O.

—The Studebaker Bros.' Manufacturing Company, which was incorporated February 14, 1852, celebrated its fiftieth anniversary last month. This company has never had a failure nor suspended business for even a short period of time. From its inception fifty years ago it has steadily increased in size and importance. Its goods are known the world over.

—The Scherzer rolling lift bridge is replacing swing bridges in various art centers of the United States and Europe because of its superior artistic outlines. It is an utter impossibility to make an artistic bridge out of a swing bridge, but it is a comparatively easy matter to design the Scherzer bridge on ornamental lines. In the matter of cost and utility, also, the Scherzer bridge is by far the better of the two.

—There were 5,057 miles of railways built in this country in the past year. Texas has a long lead, having built 583 miles, Oklahoma coming next with 428 miles, and New Mexico third with 275 miles.

The young Southwest is developing wonderfully. Five Eastern States now report no new mileage, while Nebraska alone, among Western States, has not increased her railway lines.—From the *Four-Track News* for February.

—The Buffalo Meter Company, Buffalo, N. Y., has recently issued a very attractive catalogue of twenty pages, fully illustrated, showing the principles upon which their well known meters are made. The line of meters made by this company is complete. It has recently added to its list what is known as the Improved Niagara Water Meter for general house use. Those interested in the subject should send for a copy of this catalogue.

—The Southern Railway Company is wiser in this day and generation than many of its contemporaries. It realizes that good roads laid to its various stations are splendid feeders for its freight traffic, and that every bad road hinders the growth of its business. For this reason it has carried on very enthusiastically a good roads campaign since the first day of last November, only stopping long enough for the holidays. Its second trip will end the middle of this month, when it will probably wind up this work for the season at Charlottesville, Va.

—It is generally supposed that there is nothing better for connecting sections of hose together, or for connecting hose to hydrants, etc., than the screw couplings in common use, but if we believe what is said of the "Quick-as-Wink" Couplers in places where they have been in use several years, we must conclude that screw couplers are no longer the best. The splendid record that the "Quick-as-wink" Couplers have made for quick work, convenience of use, safety, reliability, durability, etc., etc., should command the attention and earnest consideration of firemen who want to be up to date with everything pertaining to their equipment.

—The Watson Wagon Company, of Canastota, N. Y., reports its business in a flourishing condition. The factory, owing to the increasing volume of business, has recently been enlarged. The company expects soon to place on the market a new garbage wagon, which is thoroughly protected by patent. This new device will be covered more fully at a later date and should prove of good service for the disposal of garbage containing much liquid. It also manufactures grading wagons, asphalt wagons and an ash or garbage wagon. All these have given splendid satisfaction and have saved many dollars to taxpayers. The various people using them speak highly in their praise.

CURRENT LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—

Municipal Reports Received

Electric Lighting, by F. B. Crocker, is a practical exposition of the art for the use of engineers, students and all interested in the installation of electrical plants and their operation. This is the second volume on this subject, and it relates to the conductors for transmitting and distributing the current to the lamps with all the necessary switches, meters and appliances that are employed in securing the safe and proper supply of electricity. As the first volume related to the systems of generating electricity, this volume deals with those portions of lighting systems outside of the plants themselves. The first part of the work is devoted to the properties of conductors and the various systems of electrical distribution. The author then discusses overhead and underground conductors, and goes on to treat of arc and incandescent lamps and interior wiring. A chapter is devoted to electric meters. There are two appendices to the book, the first of which gives the provisions of the National Electrical Code as adopted by the National Board of Fire Underwriters. The second appendix contains the report of the committee on standardization as accepted by the American Institute of Electrical Engineers. There are many valuable tables throughout the work, and it is liberally illustrated. As both volumes are intended as text books for engineering schools as well as hand books for practicing engineers, detailed matter has been omitted as far as was possible to do so and still retain absolute clearness and all essential material. Published by D. Van Nostrand Company, New York, N. Y. Cloth, 505 pages, 8vo., \$3.00.

THE purification of sewage must be undertaken sooner or later by nearly every community in the world, for the purity of its water supply will depend not so much on remedying the pollution after it has gotten into the water, but on preventing the evil from occurring. *Bacterial Purification of Sewage*, by Sidney Barwise, gives a practical account of the various modern biological methods of purifying sewage. It is a supplement to his former work on *The Purification of Sewage*, and is the substance of a report prepared by the author for the use of the various District Councils of Derbyshire, England. The work has the advantage of having been prepared by an engineer as well as a chemist and bacteriologist, and thus the subject has been treated from every standpoint. While the book is a small one, it will be found that there is no padding, and the facts have been condensed as far as clearness would allow.

The book is abundantly illustrated with half-tones and line cuts, and the best methods of building purification plants are clearly brought out by them. Two large plates show detailed plans for building a sewage disposal plant for populations of 1,000 and 2,000. The book is divided into five sections. In the first section the author takes up the character of sewage and the volume to be dealt with. He outlines the chemical changes to be effected by purification, gives a standard of purification and states the general methods. Purification by biological methods is the subject of Section 2, and here the author discusses the closed vs. the open septic tanks and the anaerobic bacteria beds. Section 3 deals with the "Oxidation of Sewage," the principles involved, nitrification, essentials of a sewage filter and the contact bed vs. continuous filters. "Contact Beds Contrasted with Percolating Filters" makes up Section 4, and here is explained the varieties of contact beds, filters and sewage distributors and the different methods of applying sewage. The advantages of the contact beds and of filters are set forth, and valuable tables are given showing the results of experiments with both methods of treatment. In conclusion the author sums up the relative merits of different bacterial processes and states the conditions that indicate what process should be adopted to meet local circumstances. Published by Crosby Lockwood & Son, London, and D. Van Nostrand Company, New York. Cloth, 48 pages, price \$2.50.

THOSE who intend visiting the city of Duluth, Minn., should send for a copy of *Illustrated Duluth*, which is a condensed guide to the streets, buildings, parks, and places of interest in the "Zenith City." By the aid of this little booklet visitors will be able to see the city in the shortest possible time and not miss any of the good things there. It is published by The Duluth Improvement Association, of which Mr. Thomas E. Hill is the secretary. The price of the book is 25 cents.

THE rapid growth of cities makes necessary a yearly edition of any manual that is up-to-date and is to serve well the purpose for which it was designed. The issue of the *London Manual for 1902* has kept pace with events and, consequently, is larger and better than ever. Its 400 pages gives all the latest information from official

sources so that it can be relied on explicitly. The local government of London is one of the most complicated in the world, but all its features are set forth in this book clearly and accurately.

Many new features have been introduced this year. The London County Council is endeavoring to preserve all the historic buildings within its jurisdiction and the *Manual* tells of the work done in this direction and that to be accomplished. There are interesting articles on locomotion in London, a subject of greatest interest to residents of that city; municipal fire insurance, which is being actively agitated, and the latest statistics on population, police, fire, engineering and the thousand and one subjects about which people want to know. It would be impossible to enumerate here all the book contains, but if one wishes to learn anything about the largest city in the world, one shilling, six pence (\$.37) will bring this book to enlighten one. Published by Edward Lloyd, 12 Salisbury Square, Fleet street, London, E. C.

To people on this side of the Atlantic it appears strange that the report of a department of any city government should be offered for sale. Yet a second thought would suggest that all who are especially interested should, and would, be willing to contribute something toward the large expense incident to the publication of reports. The annual report of the *Rivers Department of the City of Manchester*, England, for 1900-901 is sold by P. S. King & Son, Great Smith street, Victoria street, Westminster, London, S. W. The price is 3 shillings and 6 pence (\$.87), but a careful perusal of the report by one interested in the subject of sewage disposal and the maintenance of rivers and streams, will show the work worth many times the price. The treatment of sewage at Davyhulme forms the subject of Part II. and Part III. treats in detail of the experiments with the bacterial treatment of sewage of Manchester. A large number of tables and diagrams, showing the results of extended experiments, makes this book of invaluable assistance to those studying sewage disposal and its bacteriological treatment.

Earth Roads is the title of one of the Farmers' Bulletin issued by the United States Department of Agriculture. As should be known to every rural dweller, the Department has a long list of pamphlets on almost every subject of interest to farmers, the subject matter of which has been prepared by experts. In the twenty-four pages making up *Earth Roads*, will be found the most practical information as to the location, grades, drainage, errors to be avoided in construction, proper cross section and width and the treatment of clay and sand highways. Maintenance and repairs and the use of road machines and wide tires are concisely explained. "Drainage is the key to success in making earth roads, and constant watchfulness is the sure means of keeping them up after they are once well made." The methods for constructing earth roads, as given in this pamphlet, are those practiced by the most successful road builders. They are simple and in the main inexpensive, and while the earth road is essentially one for light traffic, it can be made excellent and satisfactory in every way if the methods given here are carefully followed. The sentiment for good roads is rapidly sweeping over the country and by "good roads," stone roads are usually meant, but often money is not available for these and it becomes necessary then that the earth roads be placed in the best possible condition at small cost. A postal card request to Mr. Andrew Geddes, Chief Clerk of the Department of Agriculture, will bring this little booklet to anyone desiring the same.

PERIODICALS

The *Transactions* of the American Institute of Electrical Engineers for December, 1901, contains a paper by Mr. W. D'A. Ryan on *Street Illumination and Units of Light* in which he makes some interesting and instructive parallels between the different character of arcs, such as the varying, wandering and flickering arcs, and com-

pares the large and small units of illumination. He concludes among other things that open arcs give a higher maximum candle power but in an undesirable direction. The closed arcs are more steady and and superior to the other. Direct and alternating current closed arcs are on a fair basis of equality. For a given amount of energy, small units illuminate for a greater proportional distance than large units. Incandescents do not illuminate brilliantly enough to a sufficient height above the pavement to give satisfactory lighting and are, therefore, not comparable with arc lights. New York, N. Y., price per year \$5; per copy 50 cents.

In the *Atlantic Monthly* for February, 1902, Edward M. Shepard has an article of about 8,000 words on *The Second Mayoralty Election in Greater New York*. This article is similar to one written by Mr. Shepard in 1898, when he discussed the first election for mayor in the greater city. In this second long article the author attempts to show why the election went as it did and, incidentally, to justify his action in accepting the Tammany nomination when, four years before, he had taken the stump against that organization. To the public press he assigns the "most powerful stimulus of the sentiment" against Tammany. He says that the mayoralty campaign would have had a different end if Devery had not been appointed first deputy of the police department and Murphy the commissioner. To the Citizens' Union he gives credit for winning the battle because of the unremitting efforts of Mr. R. Fulton Cutting. The author then devotes some space to explaining how he decided to accept the Democratic nomination and how the sentiment of the people fluctuated back and forth between the parties, crediting District Attorney Jerome with being the hero of the campaign. "He had the burning zeal of the true crusader and * * * * * near the end of the struggle his speeches became the dominant feature" and won the day. He concludes with the statement that "the whole campaign ought to bring solid satisfaction, because it has shown * * * * * a deeper, broader, and more intelligent influence, practically exercised by public sentiment upon municipal politics, than the city had known before." New York, N. Y. Price per year \$4; per copy 35 cents.

The issue of *The Surveyor* for January 31 is a greatly enlarged edition of that periodical. It is a review of the past year in the field of municipal engineering in all its branches, including water works, garbage disposal, streets, sewage treatment, etc. Solicitor J. B. R. Conder of the Supreme Court writes of the *Legal Precedents of 1901 in Relation to Municipal Engineering*, giving the important decisions of the year. Municipal work in progress and projected in the cities and towns of the British isle forms a large portion of the issue. London, England. Price, 3d. per copy.

UNDER the Review of the Month, in *Gunton's Magazine* for February, are some trite remarks on the *Excise Problem in New York* which was the tendency to cause serious dissension among the friends of good government. Many persons are not satisfied that Mayor Low is doing all he can to carry out the Raines law by means of the entire energy of the police department. The writer suggests that "municipal government is a larger and more complex and far-reaching matter than the solitary issue of beer-drinking" and "if well-meaning enthusiasts are sincerely interested in the steady, permanent and genuine progress of the city * * * * * they will learn to be content with gradual and all-round developments that cannot come in a night." Edward Emory Hill contributes a 4,000 word article on *The Public School and Citizenship*, in which he first asks what these schools have done toward building up good citizenship. He says that "the effect of wide-spread education is to reduce the amount of crime and diminish the number of criminals" and figures show that every advance in popular education has been followed by a corresponding falling off of crime." The reason that the United States is outstripping the rest of the world in the race for commercial supremacy is because her workingmen have been educated in the public schools. "Thrift, industry and economy have always followed in the path of popular education." The computation of the sum that repre-

sents the increased earnings of hundreds of thousands of people will represent the service that the public schools have rendered our industrial life. The schools have taught self-support and self-control and a democratic spirit. One thing they have not accomplished to any great degree and that is the turning out of intelligent and conscientious voters. They have not directed the democratic sentiment "into a healthy political activity." In view of this fact the author thinks that the few attempts that have been made toward student government in schools should be encouraged and the introduction into the school curriculum of those studies that deal directly with social and political life should be largely extended. The virtues of courage, discipline and loftiness of purpose do not necessarily render a person a good citizen because the sense of civic duty and adequate knowledge of civic relations are not included in these as a matter of course. "To awaken this sense of civic duty and to give it intelligent direction is the reason for introducing into the public schools those studies that deal directly with the political, industrial and social relations of the members of a community." New York, N. Y. Price per year \$2; per copy 20 cents.

AMONG the many interesting articles in the *World's Work* for February is one on "The Best Governed Community in the World" by Frederick C. Howe. It is a sketch of the work of Hon. Tom L. Johnson, Mayor of Cleveland, telling of his ambition, what he has done to bring reforms in the city and his political philosophy. Mayor Johnson is an advocate of the Single Tax and of the school of Henry George. His policy towards the saloon is a liberal one unless they are disorderly, when vigorous measures are adopted. His ideas on social matters are very pronounced as was shown by the way he cleaned out the city workhouse just after his inaugural. While Mr. Johnson is a strong character and to be admired in many ways, his ideas on taxation of franchises are so at variance with life that a suspicion of insincerity is bound to attach itself to him despite his other good qualities. New York, N. Y. Price \$3 a year; 25 cents a copy.

THE February number of *Country Life in America* is an enlarged issue of that usually beautiful magazine. The magnificent illustrations that are in many instances worthy of framing, make the urban dweller long for a day's ramble among the scenes that are represented. New York, N. Y. Price per year \$3; per copy 25 cents.

Municipal Reform is the subject of a 2,000 word article by John Dolman in *The Arena* for February. The author attempts to solve the problem of bad government and suggests a remedy which he says has never yet appeared in print. He says that the "boss" is not an abnormal growth upon our system, but is the natural and logical result of the conditions." It is the tendency of the present methods of conducting elections that one man should obtain control. A system by which the individual desires of each voter could be ascertained, without reference to nomination, and not interfere with his partisanship is what is needed. Under this system one thousand citizens have the right to make a nomination. The names of all the candidates so nominated would be printed on a ballot and each voter would mark a "1" after his first choice, a "2" after the second and so on. The ballots of the candidate having the fewest votes could be redistributed among the other candidates in accordance with the second choice marked upon them, etc. By this method "the energy of any reform movement need be wasted only so far as to control one-tenth of the convention or secure the support of one thousand citizens." The value in this lies in the fact that business men refuse to neglect their business to enter politics and this forms the greatest hindrance to reform. Leigh H. Irvine writes of *San Francisco's Union Labor Mayor*, Eugene E. Schmitz, recently elected. Mr. Irvine treats it from a union standpoint and does not think that Mayor Schmitz will prove all that the unions had hoped. There is a difference of opinion as to his good qualities, some declaring that he will come under the influence of the "plutocratic Republican party." "One thing has been decided," says Mr. Irvine, "labor has the power to combine and win a victory at the polls." New York, N. Y. Price per year \$2.50; 25 cents a copy.

MUNICIPAL REPORTS

The annual reports of the Cambridge, Mass., Water Board, for 1901, of the Water Commissioners of Middletown, N. Y., for 1901, and of the Secretary of the Board of Water Works and Electric Light Commissioners of the city of Lansing, Mich., for 1901, have been received.

WE are in receipt of the annual addresses and messages of Hon. Ralph W. Ellis, Mayor of Springfield, Mass., Hon. Charles S. Baxter, Mayor of Medford, Mass., and of the Hon. James L. Schaadt, Mayor of Allentown, Pa.

City Comptroller James H. Smith, of Baltimore, Md., has forwarded to us a copy of his annual report for the year 1901 and we have also received the fifty-fifth annual report of the City Auditor of Providence, R. I., for the year ending September 30, 1901, showing the receipts and expenditures of that city.

Chief Harry L. Marston, of the Fire Department of Brockton, Mass., and Chief Engineer R. W. Dutton, of the Fire Department of the District of Columbia, have sent us their annual reports for the year 1901. The annual report of the Board of Police of Fall River, Mass., has been received for the year 1901.

The report of the Park Department of Detroit, Mich., for 1901, is the usual beautiful booklet that the department publishes yearly. In its composition, in its typography and in its illustrations it is by far the most beautiful report of any department that we have ever received. Would that as much taste were shown in similar reports from other cities!

Mr. A. E. Winchester, General Superintendent of the Electric Works of South Norwalk, Conn., has sent us the report of the Board of Electrical Commissioners for 1901. The annual report of the City Electrical Department of Cambridge, Mass., for 1901, has come to hand, as also the report of the City Electrician, Mr. Charles F. Hope-well, on the "Principles and Advantages of Municipal Conduits," dated December, 1901.

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